Author:
Elsayed, Mohamed G A A

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Do textual disclosures matter?

Evidence on corporate failure prediction, expanded audit report, internal control effectiveness, and capital market consequences

Do textual disclosures matter? Evidence on corporate failure prediction, expanded audit report, internal control effectiveness, and capital market consequences

Mohamed Gamal Abdelhalim Ali Elsayed

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Abstract

This thesis develops three essays investigating the feasibility of textual disclosures (which are also referred to as narrative-related disclosures) in corporate failure prediction and how such disclosures (particularly that of risk) relate to internal control effectiveness and ultimately the usefulness to the capital market participants as follows.

First, by creating a comprehensive corporate failure-related lexicon, this thesis explores the incremental explanatory power of narrative-related disclosures in predicting corporate failure. We find that corporate failure-related narrative disclosures significantly predict firms' failure up to two years ahead of actual failure. Additionally, we find that a financially distressed firm would become more vulnerable when financial constraints befall, which in turn would precipitate corporate failure. Various robustness tests assure the credibility of the explanatory ability of corporate failure-related narrative disclosures to predict corporate failure. Collectively, our results show the feasibility of these narrative-related disclosures in improving the explanatory power of models that predict corporate failure.

Second, in 2013, the revised International Standard on Auditing (ISA) 700 (UK and Ireland) mandated the expanded audit report. The mandate seems not to be affecting investors' reactions according to recent archival studies, leading regulators and standard-setters all over the world to raise a concern regarding the usefulness of the new reporting regulation and the information content of the expanded disclosure. Therefore, this thesis addresses this concern as follows. We first document that firms receiving an expanded audit report with a higher level of disclosure on risks of material misstatement (materiality) exhibit significantly higher (lower) idiosyncratic risk, beta and cost of equity. This finding suggests that expanded auditor's disclosure meaningfully relates to the information risk that a firm presents to investors, implying that it is not generic. Thus, firms complying with the new reporting rule, which have relatively more reliable financial reporting, can benefit from lower information risk and cost of capital. Second, we find evidence that the new reporting regime relatively influences trading volume and volatility of market returns. Third, we find that information conveyed by the expanded auditor's report is reflected in bid-ask spread, trading volume, volatility of market returns, and analyst forecast dispersion. Collectively, our analyses are consistent with the expanded auditor's report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants. This firm-specific and useful disclosure supports the FRC decision mandating the expanded audit report and encourages successors (IAASB and PCAOB).

Third, this thesis investigates the impact of internal control effectiveness on the level of textual risk disclosure (aggregate risk disclosure and its tone including good news, bad news, and net tone about risk). Our findings suggest that firms with an ineffective internal control system exhibit significantly lower levels of aggregate risk disclosure and its tone than firms with effective controls. Besides, our further analysis shows a significant change in textual risk disclosure behavior (higher levels of aggregate risk disclosure and its tone) provided by managers of firms with recurrent ineffective internal controls. Pursuant to agency theory, this behavior change is prompted to reduce the expected public uncertainty and agency problems that result from having recurrent ineffective internal controls. We also investigate the usefulness of the internal control effectiveness reporting and textual risk disclosure through observing their impacts on market liquidity and investor-perceived risk. Results suggest that firms reporting ineffective internal controls are likely to have more information asymmetry and investor-perceived risk than control firms. Furthermore, the evidence we find suggests that textual risk disclosure decreases information asymmetry, but does not affect investor-perceived risk. Finally, we illustrate that the information content of internal control effectiveness reporting and textual risk disclosure affect investors' reaction around the 10-K filing, particularly for firms with a weak communication environment. Collectively, the results from our analysis fill an apparent gap in literature on the importance of internal control effectiveness, as well as the usefulness of the external auditor's attestation on a firm's internal controls and management textual risk disclosure.

Author's declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

SIGNED: ..... [redacted] ..... **DATE:** 05/02/2020 .....

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Dedication

First of all, I want to share some of Matthew McConaughey's words in his Oscars acceptance speech (2014): "[thanking] God because He has graced my life with opportunities that I know are not of my hand or of any other hand. He has shown me that it is a scientific fact that gratitude reciprocates."

To my parents for their love and endless support.

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Chapter 1. Introduction

Despite the extensive prior literature on the characteristics of quantitative accounting data, particularly earnings, for both the evaluating role *ex-ante* and monitoring role *ex-post*, the incremental role, determinants (the main incentives), and consequences (the usefulness) of textual disclosures have received less attention (e.g., Dyer et al., 2017). Additionally, although risk disclosure is a major strand of literature on textual disclosures, less is known about both the underlying drivers of corporate risk disclosure and the informativeness of such disclosure (e.g., Elshandidy et al., 2018). Remarkably, literature offers three unanswered research questions: first, do textual disclosures provide an incremental explanatory power that predicts corporate failure? (e.g., Loughran and McDonald, 2016); second, does the expanded auditor reporting, that recently became effective in the UK and worldwide, have economic benefits for the capital market? (e.g., Gutierrez et al., 2018; Lennox et al., 2019); third, do internal control effectiveness drive a firm to externally disclose its risks, and if so, how, and does the reporting on those risks and the effectiveness of internal controls impact market indicators? (e.g., Schneider et al., 2009; Elshandidy et al., 2018). These unexplored research questions leave a considerable gap in literature and thus, this thesis aims to contribute to literature by empirically addressing them.

This thesis, therefore, consists of three essays. These essays are, however, not only motivated by academic literature. Regulators, standard-setters, preparers, investors, and other stakeholders have paid special attention to textual disclosures in general, and risk disclosure in particular, amid the large market-wide downturns and fluctuations, especially during and after the financial crisis of 2007-2008, and following the accounting irregularities that resulted in high-profile corporate failures like Enron (e.g., Kravet and Muslu, 2013; Dyer et al., 2017). In addition, as indicated by Li (2010), the context of textual disclosures, which has significantly developed in both length and information content, provides a unique opportunity to understand the financial numbers and test relevant economic hypotheses. This communication context is also a powerful setting to understand managers' incentives and, thus, predict *ex-ante* and realize *ex-post* corporate decisions

and performance. For example, prior research (e.g., Kearney and Liu, 2014) suggests that textual disclosures are well-reflective of a firm's internal and external conditions and, as a result, provide a powerful explanatory power to predict corporate investment decisions and thus, firm prospects. This is also consistent with the suggestions of Li (2006) in relation to textual risk disclosure.

Accordingly, using the unique context in the UK (see, for example, Taffler, 1984), Chapter 2 of this thesis examines the feasibility of using narrative-related disclosures to predict corporate failure, considering both financial distress and bankruptcy approaches. Consistent with the worldwide interest in the new rule (the revised International Standard on Auditing 700 (UK and Ireland), see FRC, 2013a) that mandates external auditors' disclosure on, *inter alia*, the risk of material misstatements, as well as the materiality level used in an audit, Chapter 3 exploits the exogenous shock of the FRC's regulatory changes regarding the auditor report in the UK to examine whether the expanded auditor report regime and information content of that report are associated with significant economic consequences for both the complying firms and capital market participants. Chapter 4 examines whether and how internal control effectiveness drives the level of textual risk disclosure using post-SOX US data. The chapter also highlights the usefulness of conveying such internal knowledge to the capital market.

The three essays of this thesis mainly revolve around the insights of agency, signaling, and legitimacy theories. More specifically, signaling and legitimacy theories lay out the fundamental premises underlying managers' incentives to voluntarily disclose on their firms' prospect of failure. That is, in order to maintain or repair legitimacy, managers are motivated to voluntarily disclose any particular events that would have a detrimental effect on the firm's legitimacy (Suchman, 1995; Deegan, 2002). Additionally, during financial distress exposure, managers are motivated to signal their firm's risks to preserve their reputation, lessen litigation risk, and reduce the cost of finance (e.g., Holder-Webb and Cohen, 2007; Cheynel, 2013). Similarly, the information content of the expanded audit report, which goes beyond the traditional standardized pass/fail audit opinion on the financial statements, is consistent with the notion that a firm's commitment to expanded levels

of disclosure should alleviate the agency problem (e.g., Verrecchia, 1982; Diamond, 1985; Healy and Palepu, 2001; Lambert et al., 2007). In line with that, the theoretical framework of Lambert et al. (2007) suggests that the quality of a firm's information systems, including the effectiveness of internal control over financial reporting, affects the information asymmetry and risk components of the firm's cost of capital by the increase in the imparted disclosure. Moreover, under normal conditions, signaling theory posits that managers are motived to disseminate their firms' risks so as to distinguish their firms from other firms that do not manage risks or do so less effectively (e.g., Elshandidy and Shrives, 2016).

The first essay of this thesis tests the hypothesis that narrative sections of annual reports communicate useful information to predict corporate failure. Specifically, this study expects that firms with significantly high levels of corporate failure-related narrative disclosures are more likely to fail. For this purpose, we create a comprehensive corporate failure-related lexicon to capture the corporate failure sentiment in annual report narratives. Creating that lexicon is important in accordance with the call by prior textual analysis/disclosures research (e.g., Henry and Leone, 2009; Loughran and McDonald, 2016) for developing a wordlist in the context of each textual-subject study, since reliance on a wordlist that is derived from a different subject would probably cause spurious or less accurate results. Additionally, generating our corporate failure-related lexicon within the failure context in the UK avoids potential limitations related to using the commonly-used wordlists (e.g., Loughran and McDonald, 2011) outside the US context (Ataullah et al., 2018). In addition to the consistency and practical aspects of the corporate failure-related lexicon against corporate failure literature and the UK insolvency law, it assures validity and reliability. Consistent with our expectations, we find that higher incidence of corporate failure-related narrative disclosures in the annual reports is strongly associated with a higher likelihood of corporate failure. Specifically, we find that these disclosures offer an incremental predictive ability relative to accounting, market and macroeconomic variables that are widely used in the classical corporate failure prediction models.

In order to provide more meaningful information content beyond the boilerplate pass/fail model of the audit report, standard-setters and regulators worldwide (with an initiative started by the UK in 2013; refer to Chapter 3, Section 3.2. for more details) adopt the expanded audit report. Recently, however, the inconclusive evidence on the usefulness of the expanded audit report has raised PCAOB's concern (PCAOB, 2017). Additionally, FRC (2016) has indicated an interest in reviewing both the volume and the content of auditor risk disclosure. Exploiting the exogenous shock of the FRC's regulatory changes related to the auditor report in the UK, the second essay of this thesis, therefore, investigates whether the expanded auditor's report exhibits information specific to the audited company, thereby yielding benefits to complying firms through lower information risk that translates into lower cost of equity. It also considers whether the reporting regulation change and information content of the expanded audit report affect information asymmetry and risk perceptions. Consistent with our expectations, our cross-sectional and intertemporal tests suggest that firms complying with the new reporting rule, which have relatively more reliable financial reporting, i.e., have relatively low risks of material misstatement inducing the auditor to specify a high level of materiality, can benefit from a lower information risk (idiosyncratic risk and systematic risk) and a lower cost of capital. Put differently, the expanded auditor reporting is not generic but instead meaningfully reflects the information risk that a firm presents to investors. The evidence we find also suggests the usefulness of the audit report regime change and the informativeness of the expanded auditor disclosures via observing the relation with market liquidity, investors' perceived risk, and analyst forecast dispersion.

Moving to the US, the Sarbanes–Oxley Act (SOX), in particular Section 404, requires management to establish and maintain an effective internal control system to significantly and positively reveal firm risk factors and uncertainties that affect internal management reports and thus decisions based on these reports, so as to ensure the reliability of financial reporting (e.g., SEC, 2003b). However, the benefits of this requirement remain controversial and leave an apparent gap in SOX and internal control literature (e.g., Schneider et al., 2009; Clinton et al., 2014). A firm's

efficiency in disclosing its risks externally is an important component of reliable information (e.g., SEC, 2003a; PCAOB, 2004). Besides, the regulatory actions (e.g., PCAOB, 2004) and prior research (e.g., Ashbaugh-Skaife et al., 2008, 2009; Donelson et al., 2017) suggest that the internal control system may be ineffective in detecting and disclosing more risk factors and contingencies on a timely basis when there is an internal control weakness. The third and final essay of this thesis, therefore, hypothesizes that an effective internal control system reveals more risk factors and contingencies, thereby enhancing managers' ability to convey a higher level of textual risk disclosure. Additionally, as prior research exploring the usefulness of textual risk disclosure and external auditor reporting on internal control effectiveness to the market shows inconclusive results (e.g., Schneider et al., 2009; Gupta et al., 2018; Elshandidy et al., 2018), this study also examines whether textual risk disclosure and reporting on internal control effectiveness are useful to the market participants through observing their impacts on market liquidity and investor-perceived risk. Consistent with our expectations, our results suggest that firms with an ineffective internal control system exhibit significantly lower levels of aggregate risk disclosure and its tone than firms with effective controls. Our further tests also show a significant change in textual risk disclosure behavior (higher levels of aggregate risk disclosure and its tone) provided by managers of firms with recurrent ineffective internal controls. Pursuant to agency theory, this behavior change is prompted to reduce the expected public uncertainty and agency problems that result from having recurrent ineffective internal controls. With regard to the usefulness to the market, the evidence we find suggests that firms reporting ineffective internal controls are likely to have more information asymmetry and investor-perceived risk than control firms. It also suggests that textual risk disclosure decreases information asymmetry, but that disclosure is apparently statistically insignificant in terms of investor-perceived risk. Finally, we indicate that the information content of internal control effectiveness reporting and textual risk disclosure affect investors' reaction around the 10-K filing, particularly for firms with a weak communication environment.

Collectively, as offered by the first essay, the additional role of failure-related narratives in rendering early warning alerts is imperative to help interested parties (e.g., the FRC, stockholders and lenders) to take either preventative or remedial action. Our evidence, as offered by the second essay, that the expanded auditor report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants supports the FRC decision mandating the expanded audit report and encourages its successors of IAASB and PCAOB. Our evidence, as offered by the third essay, provides broader implications to those previously documented in the literature and rationalizes the debate around the importance of internal control effectiveness in improving the financial reporting reliability (e.g., Ashbaugh-Skaife et al., 2008; Feng et al., 2009). Furthermore, it contributes to the ongoing debate between academics (e.g., Gupta et al., 2018; Elshandidy et al., 2018) and regulators (e.g., SEC, 2009) about the usefulness of both textual risk disclosure and internal control effectiveness reporting by investigating their informativeness to the market participants. Our results contribute to literature by: 1- manifesting the feasibility of corporate failure-related narrative disclosures in enhancing the explanatory power of the models that predict corporate failure; 2- supporting the view of the FRC (followed by others such as IAASB and PCAOB as shown in Chapter 3, Section 3.2.) that the expanded auditor's report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants; 3- extending prior efforts on examining the importance of internal control effectiveness, as well as the usefulness of the external auditor's attestation on a firm's internal controls and management textual risk disclosure. The theoretical and practical implications of our findings are highlighted in details in the following chapters.

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Chapter 2. Do narrative-related disclosures predict corporate failure? UK evidence

2.1. Introduction

Several corporate failure (CF) prediction models are developed based on different modeling techniques which substantially apply a certain classical methodological approach (for a review see, Dimitras et al., 1996; Balcaen and Ooghe, 2006; Altman et al., 2017; Jayasekera, 2018) relying principally on accounting, market and/or macroeconomic indicators (e.g., Altman, 1968; Ohlson, 1980; Taffler, 1983; Goudie and Meeks, 1991; Charitou et al., 2004; Reisz and Perlich, 2007; Campbell et al., 2008; Tinoco and Wilson, 2013). However, after the collapse of major corporations (e.g., WorldCom, Enron and Lehman Brothers), growing attention has been paid to the prediction of business failures since stakeholders have become cautious about risk of business failure (Dean and Altman, 2007). Improving the ability to explain and predict CF, therefore, stands central in the literature (e.g., Balcaen and Ooghe, 2006; Jayasekera, 2018).

Remarkably, while there has recently been an increasing interest in studying the usefulness of qualitative information, little attention is paid toward employing qualitative information in CF prediction. Moreover, while the UK offers an "ideal" context for CF research (e.g., Taffler, 1984), prior research on the link between qualitative information and firm's status has mainly been conducted in the US context (a priori, due to data availability and the relative ease in obtaining qualitative data) and concerned the financial constraints (as detailed in Appendix A).[1] This chapter addresses this gap by exploring the question of whether the narrative sections of annual reports communicate useful information to predict CF.[2] In doing so, this chapter develops a textual measure for CF-related narrative disclosures (CF-Disclosure, hereafter) and examines its ability in predicting CF in the UK context. Thus, we expand prior literature in many aspects as follows.

[1] Financial distress and bankruptcy, as the main determinants of CF, are distinctive from financial constraints (see Whited and Wu, 2006; Senbet and Wang, 2012; Hoberg and Maksimovic, 2015; Farre-Mensa and Ljungqvist, 2016). Although financial constraints examination is not our main interest, our further analysis highlights whether financial constraints would promote the incidence of CF.

[2] Throughout the chapter, CF refers to financial distress risk and bankruptcy.

First, a few studies have employed qualitative information revealed in the narrative sections of annual reports or 10-K filings (narrative-related disclosures) to test its predictive ability for financial constraints or to assess (but not to predict) bankruptcy and financial distress. For example, Kaplan and Zingales (1997) and Hadlock and Pierce (2010) use narrative-related disclosures of 10-K to construct indices so as to classify financially constrained firms. Furthermore, Hoberg and Maksimovic (2015) conclude that narrative sections have an incremental effect in predicting financial constraints. Utilizing the 10-K filing mandatory disclosure, Bodnaruk et al. (2015) indicate that there is a positive relationship between managers' belief of a firm's future financial constraints and the extent of 10-K narratives that reflect this outlook. In the same way, Holder-Webb and Cohen (2007) indicate that Management's Discussion and Analysis (MD&A) is the officially approved channel for managers to explain the source of financial distress to investors. In a contemporaneous paper complementary to our chapter, Gandhi et al. (2019), using an approach different from ours and employing a sample of the US banks, suggest the negative sentiment of 10-K narratives as a new proxy for bank distress. Still, particularly in the UK context, no previous study has examined the feasibility of the annual report narratives to directly predict CF and improve the explanatory power of the variables widely used in classical CF prediction models.

Second, there is a major difference between the insolvency laws in the UK (where it is creditor-friendly) and the US (where it is debtor-friendly). Consistent with the evidence of Davydenko and Franks (2008) that the bankruptcy code is a significant factor in studying CF, it seems important to investigate CF prediction outside the US. Second, disclosure type and regulations are also different in both countries. As opposed to the US, where narrative disclosure is highly regulated, narrative disclosure in the UK is mostly voluntary. These two types of disclosure are also provided under different enforcement laws since the common law is dominant in the UK while the code law is dominant in the US, which has more enforcement (Muñoz-Izquierdo et al., 2019). In this respect, prior research (e.g., Elshandidy et al., 2015) documents a significant impact of the legal system in explaining the observed variations in mandatory rather than voluntary

disclosures, which are influenced more by firm-specific factors. In addition, compared to the US, the UK's companies do not file quarterly, and the UK's disclosure environment is less rich (Lennox et al., 2019). That is, management in UK companies is expected to consider annual report narratives as an important source for revealing information about the firm's prospects.

Third, UK companies are managed in corporate governance settings that are significantly different from their counterparts in the US (Short and Keasey, 1999; Franks and Mayer, 2002; Toms and Wright, 2005), and within less severe litigation risk (Lennox et al., 2019). Finally, despite the limited research on the relation between qualitative information and CF, the findings of research are, however, mixed within a line of research that looks at the information revealed related to going concern prospects either in mandatory or voluntary environments. For example, in mandatory environments where firms are required to provide information about going concern, the evidence shows less compliance (e.g., the Canadian context: Ontario Securities Commission, 2010) or limited usefulness in predicting CF (e.g., the UK context: Uang et al., 2006). In the US context, a recent study by Mayew et al. (2015) finds that the opinions of management about going concern revealed in MD&A of 10-K filings along with their tone have explanatory power in predicting whether a firm will cease as a going concern.

These distinctive aspects, collectively, motivate us to investigate the incremental explanatory power of narrative-related disclosures in predicting CF in the UK.[3] Our findings suggest that higher incidence of CF-Disclosure in the annual reports is strongly associated with a higher likelihood of CF. Specifically, we find that CF-Disclosure offers an incremental predictive ability relative to accounting, market and macroeconomic variables that are widely used in the classical CF prediction models. In an economic perspective, results show that the higher incidence of CF-Disclosure is

[3] Our motive in visiting the UK is in line with, among others, that of Charitou et al. (2004) who clearly introduce the UK context, rather than the US, to be "the main motivation for [their] study" to the incremental information content of operating cash flows to predict CF. Nevertheless, we emphasize that our choice for the UK since it provides an ideal setting to conduct our research and thus, this does not limit generalizing our results to other regimes. Therefore, it seems reasonable to see the novelty of contribution provided by our chapter as an extension of the US-based literature.

associated with a 39.7% greater likelihood of CF within a year; 31.9% within two years. In addition, the predictive accuracy and explanatory power of CF-Disclosure alone is about 41% and 25% relative to that provided by accounting, market and macroeconomic variables combined in the year preceding the CF and the penultimate year, respectively. Incorporating CF-Disclosure into a base model (representing a classical CF prediction model) that contains accounting, market and macroeconomic indicators provides about 16% increase in the explanatory power relative to that provided by the base model for the year prior to CF; 9% for the two years prior to CF. Collectively, the results imply the feasibility of CF-Disclosure in enhancing the explanatory power of models that predict CF. Our results are robust to the inclusion of firm corporate governance factors that prior research shows to be related to CF.

These findings have theoretical and practical implications. Theoretically, in view of criticisms of CF prediction models based on financial ratios, academics can build on our chapter to improve or revise these classical models. Our results can be sound not only for the UK but also for other countries (e.g., Germany which has an insolvency regime that, like the UK, reflects the legacy of the creditor-in-possession framework). Practically, the additional role of failure-related narratives in rendering early warning alerts is imperative to help interested parties (e.g., the Financial Reporting Council, stockholders and lenders) to take either preventative or remedial action. Information embedded in the annual reports' narratives can strengthen audit's analytical review, support the issuance of the qualified (going concern) audit opinion and thus reduce litigation and reputational loss risks.

Our chapter contributes to CF literature as follows. Our chapter advances extant literature on CF by suggesting the incremental role (explanatory ability) of the annual report narratives as a distinct indicator to objectively and directly predict CF. This chapter also contributes to CF literature by creating a comprehensive CF-related wordlist. This wordlist aims to capture CF sentiment in annual report narratives, as well as assist future CF research to study the likelihood of CF beyond traditional CF models. Furthermore, our chapter advances the extant evidence on CF

(as summarized in Appendix A), which lacks generalization as it relied on a limited number of firm-year observations and/or concentrated on certain industries, is subjective as it relied principally on manual content analysis, and is outdated as it relied on old empirical data. Our research is large-scale and relied on an objective textual method to capture the role of qualitative information in predicting CF. Our method can be applicable to different contexts (e.g., emerging economies), different industries (e.g., financial firms), cross-country (comparative evidence) with a minimum cost by relying on our algorithm. In addition, our chapter augments CF literature, which for decades has suffered the major deficiency of overlooking the underlying theory of failure (Dean and Altman, 2007; Peat, 2007), by postulating the theoretical foundations for explaining the reasons for voluntary corporate failure disclosure. Having reasonable theoretical premises provides the initial validity of our work (Christenson, 1983).

The remainder of this chapter proceeds as follows. Section 2.2. represents background of CF in the UK context. Section 2.3. discusses the theoretical considerations. Section 2.4. reviews relevant prior literature and develops the research hypothesis. Section 2.5. designs the research methodology including data description, measurement of variables and the multi-period logit model formulation. Section 2.6. discusses the empirical results, further analysis and robustness checks. Section 2.7. concludes, discusses limitations and suggests avenues for future research.

2.2. Background

The UK context offers some unique features, e.g., the amount and quality of financial/non-financial information about corporate entities, as well as a CF rate among the highest in advanced countries, which provide the UK with an environment which is "ideal" for the assessment of company solvency and performance (Taffler, 1984; Charitou et al., 2004).

Furthermore, the UK insolvency law (e.g., Insolvency Act 1986 and Enterprise Act 2002) is different from the US Bankruptcy Code (e.g., Chapter 11) where the latter provides a protection to the debtor (distressed firm) by allowing it to stay upon the filing (continue as a going concern),

whereas in the former, such opportunity to stay is not necessarily granted as an administrator would replace the management with the assumption that the insolvent firm has a concentrated creditor mass. Consequently, under the UK's insolvency regime, financially distressed firms are more likely to go bankrupt compared to those in the US. Similar to the UK, the European insolvency regimes have the legacy of creditor-in-possession frameworks, implying that debtors and creditors have exhausted all possible remedies. Therefore, liquidation, through selling the company or its assets, is assumed to be the principal means of resolving creditor claims (refer, for example, to Broude et al. (2007) and Fitch Ratings (2014) for a comparative study of insolvency regimes in the US, the UK, and the key markets in the EU).

The UK insolvency law contains a number of insolvency shelters including: (1) Company Voluntary Arrangement (CVA); (2) Administration; (3) Administrative Receivership (AR); (4) Creditors' Voluntary Liquidation (CVL); and (5) Compulsory Liquidation (CL).[4] As seen, regardless of the route by which an insolvent company would endeavor to survive, the UK's legacy assumption predicated on the creditor-in-possession framework remains dominant and basically suggests the formal insolvency process for settling the disputes between creditors and financially distressed firms.

This might explain why the UK experienced the highest number and rate of CFs in the world from the 1970s-1980s (it was almost double that of the US on average, e.g., Altman, 1984). During the 1980s several UK sectors (e.g., small industrial businesses) experienced high failure rates of 50% for a period of five years (Charitou et al., 2004). Agarwal and Taffler (2007) show that the number of UK firms at risk of failure is still growing and the high bankruptcies are expected to continue.[5] Given these statistics and the increasing criticism of Taffler's (1983) MDA-based model (Charitou et al., 2004; Jayasekera, 2018), there is a need to update CF prediction modeling after

[4] For more details regarding the UK insolvency regime see for instance: Insolvency Service and Companies House. Available at: https://www.gov.uk/ and/or Accountant in Bankruptcy (AiB). Available at: https://www.aib.gov.uk/

[5] For UK companies' insolvency records, refer to: Insolvency Service and Companies House. Available at: https://www.gov.uk/ and Trading Economics. Available at: http://www.tradingeconomics.com/

considering essential factors such as textual analysis, which will be grounded in theory and literature in the following section.

2.3. Theory

A theoretical analysis of how capital structure affects risk-related disclosure is introduced by Fatemi and Luft (2002) and the possibility that the changes in the financial structure can be linked with the managerial incentive to alter the firm's perceived risk is illustrated by Ross (1997). In addition to preserving their reputation, during financial distress exposure, managers (by signaling) attempt to mitigate information asymmetry to reduce the cost of finance; in this respect a potential CF-Disclosure can be considered as an effective tool (Francis et al., 2005; Holder-Webb and Cohen, 2007; Cheynel, 2013; Elshandidy and Shrives, 2016). In line with this view, capital need theory indicates that voluntary disclosure aids in achieving a company's need to raise capital at a low cost (Francis et al., 2005). Consequently, lowering asymmetry of capital market information to reduce the cost of capital represents a major incentive for managers to voluntarily disclose risk, particularly ahead of bankruptcy or during financial distress periods.

According to Holder-Webb and Cohen (2007), managers have impetuses to relieve stakeholders' responses toward the financial distress risk by disclosing the event of distress risk. Furthermore, they argue that managers' incentives to disclose such information could be a function of the ethics-economic formula, which assumes that managers' intent to render a more complete disclosure that enables stakeholders to react wisely is driven by economic or ethical considerations. Additionally, legitimacy theory, which assumes that there is a "social contract" between firms and society which can be threatened or revoked, leading the firm to cease to exist if its legitimacy is in question (Mathews, 1993), can explain the incentives to reveal information about CF. Seeking to maintain or repair legitimacy, managers are motivated to voluntarily disclose any particular events that would have a detrimental effect on the firm's legitimacy (Suchman, 1995; Deegan, 2002). In so doing, the defensive impression management technique is used (Suchman, 1995; Ogden and

Clarke, 2005; Samkin and Schneider, 2010) allowing managers to formulate a normalizing account (that is, deny, excuse, justify or explain the event, apologize or express remorse and guilt) and perform strategic restructuring (involving disassociation).[6]

Pursuant to legitimacy theory, where a firm's legitimacy is threatened, any strategy that managers implement to maintain or repair legitimacy "must" be accompanied by voluntary disclosure, especially in the annual reports (Deegan, 2002). In relation to legitimacy, legal compliance and the concept of accountability, which are consistent with the regulatory and cognitive legitimacy dimensions proposed by Scott (1995), offer a further explanation of managers' motive to employ voluntary narrative disclosure to report threats to a firm's legitimacy (Samkin and Schneider, 2010). With a belief in the responsibility to report, ethical management is pledged to completely disclose all relevant information regardless of the impact on the firm's image (Holder-Webb and Cohen, 2007). Otherwise, through the legitimacy process, managers of firms with a high level of public monitoring would have incentives to increase risk disclosure in order to reduce litigation and reputational risks (Cormier and Gordon, 2001; Oliveira et al., 2011a). Prior research (e.g., Skinner, 1994, 1997; Francis et al., 1994) indicates that managers' incentives to voluntarily disclose firms' prospects lie in obviating concurrent legal actions such as litigation risk, especially if the firm fails.

Overall, the theoretical framework based on a confluence of corporate structure theory and managers' incentives as formulated by signaling and legitimacy theories is consistent with the call by Roberts et al. (2005, p. 6) "for greater theoretical pluralism and more detailed attention to board processes and dynamics." Such a framework was also proposed by Aguilera (2005) and is adopted by some previous research such as Elshandidy and Shrives (2016) and Oliveira et al. (2011b).

[6] Impression management is a conscious or unconscious attempt by managers to manage the real or imagined image of their firms (Neu et al., 1998; Samkin and Schneider, 2010).

2.4. Literature Review and Hypothesis Development

Since the seminal work by Beaver (1966) and Altman (1968), widespread literature classifies, assesses or predicts CF by developing financial distress and bankruptcy models. Nevertheless, prior research basically focuses on utilizing financial or accounting ratios (e.g., Altman, 1968; Ohlson, 1980; Taffler, 1983), testing market-based information (e.g., Black and Scholes, 1973; Merton, 1974; Reisz and Perlich, 2007), or studying macroeconomic determinants (e.g., Liu, 2004) to predict CF.

Meanwhile, due to several criticisms (e.g., Dimitras et al., 1996; Christidis and Gregory, 2010; Jayasekera, 2018), many serious drawbacks (e.g., Balcaen and Ooghe, 2006) and structural and assumption deficits (e.g., Agarwal and Taffler, 2008), the findings of previous CF research are debatable. That is why, on the one hand, recent studies (e.g., Campbell et al., 2008; Christidis and Gregory, 2010) resort to a so-called "combined approach" (Tinoco and Wilson, 2013) on the basis of incorporating variables from different aspects (such as accounting-based variables and market-based variables) in order to increase the predictive ability and accuracy of CF models.

On the other hand, the inclusion of non-accounting or qualitative measures in the classical failure prediction models is suggested by some authors (e.g., Ohlson, 1980; Zavgren, 1983; Keasey and Watson, 1987; Beaver et al., 2005; Shuai and Li, 2005). The majority of evidence (e.g., Hoberg and Maksimovic, 2015; Bodnaruk et al., 2015) related to employing qualitative data in prediction has been concentrated on financial constraints, suggesting a predictive contribution can go beyond the traditional financial-based measures.

Arguably, qualitative information provides useful content that can be employed to objectively and directly predict CF in addition to improving the explanatory power of the classical CF prediction models. Consistent with this notion, some studies shed light on the information content of the narrative-related disclosures and its usefulness in elucidating the source or the nature of financial distress and bankruptcy. Within the UK context, Smith and Taffler (2000) study manually the information content of the Chairman's statement and they find evidence of the ability of

narrative disclosure to predict failure.[7] For a sample of financially distressed firms, Holder-Webb and Cohen (2007) measure the disclosure quality and find that on average firms increase the quality of disclosure in the year of distress onset, and that change in disclosure behavior is fundamentally driven by the managers' economic considerations, instead of ethical status. In addition, Hanley and Hoberg (2012) conclude that the likelihood of litigation risk is decreased by managers' strong strategic disclosure in the initial public offerings prospectus. This means that narrative-related disclosures regarding distress would be used to reduce the likelihood of litigation exposure. Supporting these purposes, the SEC, for example, designates the MD&A to present an exhaustive view of the firm's financial conditions and prospects. In the Australian context, Boo and Simnett (2002) investigate the tone of management's prospective comments in the annual report, and they find that the information content and tone of these comments are significantly associated with CF. Within the US context, using a different type of firms (financial rather than non-financial) and different type of outlet (10-Ks filings rather than annual reports), Gandhi et al. (2019) find that negative tone is significantly indicative of delisting probability, increase in loan loss, and decrease in future performance.

The above-mentioned papers use mostly the text tone (positive and/or negative) in annual reports/10-K filings to examine its association with CF. There is another line of research focusing on audit and/or management reports/opinions on the firm's ability to continue as going concern. For example, Uang et al. (2006) examine the information content of auditors' and managers' reports on going concern and find that audit opinions are more informative in predicting CF than managers' reports. They further find that managers of firms with effective governance monitoring are likely to convey messages consistent with those of auditors regarding going concern disclosures. Similarly, within the US context, a recent study by Mayew et al. (2015) analyzes the text of the

[7] Furthermore, Clatworthy and Jones (2003) find systematic patterns in reporting good and bad news (in the Chairman's statements in the UK) regardless of company performance. In this, managers attribute good news to themselves, while blaming the external environment for bad news, which is consistent with impression management mentioned earlier (see footnote 6).

MD&A section of 10-K filings to examine its ability to predict a firm's ability to continue. They find that the managers' going concern opinions revealed in the MD&A section, along with the tone of that section, are significantly indicative of a firm's ability to continue as a going concern. In another context, the Spanish, Muñoz-Izquierdo et al. (2019) find that auditor's report contains informational content which significantly explains the causes of CF.

Logically, we infer that the qualitative data contained within annual report narratives have an explanatory benefit that can be exploited to predict CF. Therefore, based on the above arguments, *ceteris paribus*, we hypothesize that management in firms with a prospect of failure will use a higher frequency of CF-related words in their annual report narratives.

Consistent with the literature on general disclosure (e.g., Skinner, 1994; Kothari et al., 2009; Bao et al., 2019) and/or timeliness of such disclosure (e.g., Clatworthy and Peel, 2016; Luypaert et al., 2016; Lukason and Camacho-Minano, 2019), managers' tendency to withhold bad news and/or delay annual reporting (particularly for financially distressed firms) may be seen as a competing argument (or implied as a plausible null hypothesis). However, managers' concerns owing to financial sanctions, as well as litigation risk and reputation loss when CF approaches are still supportive of our alternative hypothesis (above). Besides, the compliance levels with filing times are around 100% for publicly quoted firms (employed in our study) (e.g., Clatworthy and Peel, 2016). That said, the competing argument derived from this broad theme still plausibly motivates our research questions about: first, whether firms with significantly high levels of CF-Disclosure are more likely to fail; second, whether CF-Disclosure offers incremental predictive ability relative to that offered by the traditional CF predictors (i.e., accounting, market and macroeconomic variables that are widely used in the classical CF prediction models).

2.5. Research Design

2.5.1. Sample selection and data collection

The present study investigates the contribution of CF-Disclosure to predict CF for a matched sample of non-financial publicly quoted firms in the UK over a period of sixteen years from January 2000 to December 2016. We choose this span for our sample because corporate governance data starts to be available on the BoardEx database in 1999, while 2016 is chosen due to data availability. Following prior literature (e.g., Charitou et al. 2004), we establish our sample of Public Limited Companies (PLCs) whose shares are publicly traded under the UK Companies Act 2006, as well as Alternative Investment Market (AIM) companies. In addition, financial firms with Standard Industrial Classification Code (SIC) between 6000 and 6999 (i.e., finance, insurance and real estate) are excluded due to their distinctive regulations and accounting practices (e.g., Bodnaruk et al., 2015). In terms of failed firms, we include observations only for firms that failed during our sample span (i.e., from January 2000 to December 2016).

Our final sample comprises a group of 272 failed firms and a group of 272 matched healthy firms. We implement this technique because it provides a systematic method to define our sample of healthy firms (e.g., Charitou et al., 2004; Balcaen and Ooghe, 2006; Hsu and Wu, 2014).[8] In accordance with most previous CF literature (e.g., Hsu and Wu, 2014; for multiple references see Charitou et al., 2004), both groups are matched based on firm size (measured by total assets specified from the last complete filed account before CF) and industry classification (utilizing SIC). In every year of our sample, firms are coded zero until the failure event, when a failed firm takes one, which implies that healthy firms take zero in every year. Following prior research (e.g., Beaver et al., 2005; Peat, 2007; Mayew et al., 2015), this approach enables us to estimate a hazard model, or as known by survival analysis, as discrete-time logit model (shown later). Shumway (2001)

[8] Employing a matched control sample is a common practice in CF prediction research. Particularly in our chapter, it helps to cut the cost of data collection because compared to financial data and the US 10-Ks (inclusively available at SEC EDGAR database), the manual collection of UK annual reports to retrieve qualitative data is substantially time and effort consuming.

indicates that considering multiple firm-year observations for both failed and healthy firms enhances efficiency, and mitigates the bias and inconsistency of the estimated coefficients as compared to a static model, particularly when the sample period is long, like ours.

Following prior literature (e.g., Campbell et al. 2008; Tinoco and Wilson 2013) we adopt a CF definition that incorporates the legal approach and financial distress approach. This definition is advantageous for considering the practical perspectives of CF and thus, improves the scope and predictive power of the empirical models (Campbell et al. 2008; Tinoco and Wilson 2013).[9] A firm is defined as *legally failed* (i.e., bankrupt) if its status is in administrative receivership, administration, company voluntary arrangement, voluntary liquidation, liquidation or when there is a cancellation of the firm and it is assumed valueless (e.g., Charitou et al., 2004; Christidis and Gregory, 2010). In addition to the previous legal approach, a firm is identified as *financially distressed* (financial approach) whenever it concurrently experiences, for two successive years, the following conditions (e.g., Pindado et al., 2008; Tinoco and Wilson, 2013): first, a negative growth in the market value; second, its financial expenses surpass its earnings before interest, taxes, depreciation and amortization. Applying these two measures jointly, besides requiring two consecutive years, provides a strong basis (the confluence and continuity of the two measures together) for regarding the firm as financially distressed. In order to ensure the accuracy of the analysis, the healthy group retains only the non-failed firms that are not exposed to financial distress.[10]

We gather the study's data from several sources as follows. Consistent with Charitou et al. (2004), the bankruptcy data are obtained from the UK Companies House – GOV.UK (https://www.gov.uk/government/organisations/companies-house) and the Bloomberg database. The accounting, market and macroeconomic data are collected from Datastream and Thomson One Banker (Worldscope), while the BoardEx database is used to compile the corporate

[9] Technical insolvency (financial distress) and legal insolvency (bankruptcy) describe the practical definitions used for CF in the UK. See, for example, https://www.businessrescueexpert.co.uk/insolvency-vs-bankruptcy-uk/

[10] Both sets of failed and healthy firms are also traced to verify their fate and that the latter have not become failing over the next few years. Observations related to failed firms are excluded after the event of failure (e.g., Shumway, 2001; see also the dynamic logit model as set out in Section 2.5.3. below).

governance data. Furthermore, the annual reports for UK publicly quoted firms are collected from multiple sources including the Thomson One Banker database, the Bloomberg database, the UK Companies House website, as well as the companies' official websites. In this respect, we operationalize the annual report as our source of narratives because it is perceived to be the major and most credible source of information for the informed parties (Elshandidy and Neri, 2015). Diction version 7 is employed to extract the scores from the annual report narratives.

2.5.2. Variables measurement

2.5.2.1. Textual analysis proceedings and CF-Disclosure

This chapter creates a comprehensive list of CF-related keywords to capture the CF sentiment in annual report narratives. In line with most prior textual analysis studies in accounting and finance (e.g., Bodnaruk et al., 2015), we adopt the *bag of words* method (Loughran and McDonald, 2011), in which the annual reports are parsed into a matrix composed of words and word count vectors.[11] Our approach is consistent with Loughran and McDonald's (2016) assertion of the importance of developing a wordlist in the context of each textual-subject study, as reliance on a wordlist that is derived from a different subject would probably cause spurious results (Loughran and McDonald, 2011).

The following procedures are applied to establish the wordlist (see figure 2.1.). (1) We review CF academic studies (e.g., Dimitras et al., 1996; Charitou et al., 2004; Balcaen and Ooghe, 2006; Altman and Hotchkiss, 2010), the UK insolvency law (e.g., Insolvency Act 1986 and Enterprise Act 2002), the online information published at Insolvency Service and Companies House (https://www.gov.uk/), company news and announcements at Bloomberg Terminal and professionals online sites such as INVESTEGATE (http://www.investegate.co.uk/). This step enables us to identify the initial wordlist. (2) Following Elshandidy and Shrives (2016), the initial wordlist is expanded by including related synonyms using Roget's Thesaurus

[11] For more information regarding the advantages of this method, refer to Loughran and McDonald (2016).

(http://www.roget.org/). (3) To develop the wordlist further, following prior research (e.g., Clatworthy and Jones, 2003; Kravet and Muslu, 2013), twenty annual reports for firms that failed after being financially distressed are randomly selected and carefully read to recognize words that are indicative of the CF. (4) To check the extent to which the CF identified words are featured, the word is omitted if: a) it is not repeated in at least two annual reports, or b) it does not appear in at least one annual report, as well as any leading wordlists of risk-related disclosures (Elshandidy and Shrives, 2016). (5) Consistent with CF literature (e.g., Casey et al., 1986; Altman and Hotchkiss, 2010) and practical aspects of the UK insolvency law, the CF aggregate wordlist is assessed and classified into three categories, which are warning, reorganizational and statistical-related concepts.

The reorganizational group reflects the company's attempts to survive. The warning group reveals management signals to stakeholders. Both show consistency with management intentions to rehabilitate a distressed firm and warn related parties about a prospect of failure. This in turn is consistent with legitimacy and signaling theories. Besides, both groups are consistent with the context of liquidation (Chapter 7) and reorganization (Chapter 11) that is effectuated through the UK (US) CF procedures (e.g., Broude et al., 2007). The statistical group represents neutral words (such as significant, probable and differ) that reflect neither warning nor reorganization. Collectively, this ensures that the CF wordlist reliably connotes the context from which it is derived, i.e., the CF context. The final CF wordlist is presented in Appendix B. Notably, in line with Loughran and McDonald (2011) and Bodnaruk et al. (2015), the words require*, loss*, risk* and impairment* are the most frequent words contributing to CF-related measure.[12] In addition, as a further check of the validity of our wordlist, 76% of the wordlist of CF is correlated with the leading risk-related wordlists.[13] More specifically, since in a contemporaneous paper complementary to our

[12] * Means any other derivatives from the original word, as consistent with previous wordlists suffixes are allowed. Although some loss, risk and fail derivatives do not meet the stage number 4/b, they are retained because these words have a strong echo in predicting CF (see Li, 2006).

[13] The aggregate risk, bad, good news and statistical wordlists of Elshandidy and Shrives (2016) are explicitly provided in their paper. Similarly, the papers of Kravet and Muslu (2013) and Campbell et al. (2014) contain their risk wordlists (with risk subcategories of financial, litigation, tax, other-systematic and other-idiosyncratic). Moreover, the six wordlists (negative, positive, uncertain, litigious, strong modal, and weak modal) of Loughran and McDonald (2011)

chapter, Gandhi et al. (2019) use the negative wordlist of Loughran and McDonald (2011) and show the 10-K's negative sentiment as a proxy for financial distress in the US banks, we test the correlation between the scores generated by our CF wordlist (comprising 267 words) and the negative wordlist of Loughran and McDonald (2011) (comprising 2,355 words). Results show that the correlation between the two wordlists is significantly high (around 62% at the 1% significance level), which implies that the two wordlists in common capture a large proportion of CF-Disclosure from the narrative sections of annual reports. The similarity with the work of Gandhi et al. (2019) provides further evidence of our wordlist's validity. Additionally, the negative wordlist of Loughran and McDonald (2011) is widely used in both the accounting and finance literature to measure the overall negative sentiment in business settings (e.g., Mayew et al., 2015; Loughran and McDonald, 2016). Consistent with the power law probability distribution (or so-called Zipf's law; see Loughran and McDonald (2016) for more details), this highly significant correlation suggests that our CF wordlist is important to identify words most related to CF in narratives' overall negative sentiment.[14]

To measure the *CF-Disclosure* score, as is typically done in textual analysis literature (see the review of Loughran and McDonald, 2016), we calculate the percentage of words indicating the likelihood of CF in the narrative sections of annual reports (i.e., number indicating the likelihood of CF scaled by the total number of words in the annual report). The reliability of the *CF-Disclosure* and its tones of warning and reorganization are statistically examined using Cronbach's alpha (Elshandidy and Shrives, 2016). The Cronbach's alpha of 87% for the computed scores of the *CF-Disclosure*, as well as its sub-tones, implies that the internal consistency between the *CF-Disclosure* and its sub-tones is high relative to the generally accepted value in social science of 70%

and the constraining wordlist of Bodnaruk et al. (2015) are available at Bill McDonald's web page (http://www3.nd.edu/~mcdonald/Word_Lists.html).

[14] We also test the incremental predictive and explanatory ability of our CF-related warning category against Loughran and McDonald's (2011) negative category, refer to the robustness checks in Section 2.6.3. It is worth noting that having our CF wordlist generated within the failure context in the UK, on its own, avoids potential limitations related to using Loughran and McDonald's (2011) wordlists outside the US context (Ataullah et al., 2018).

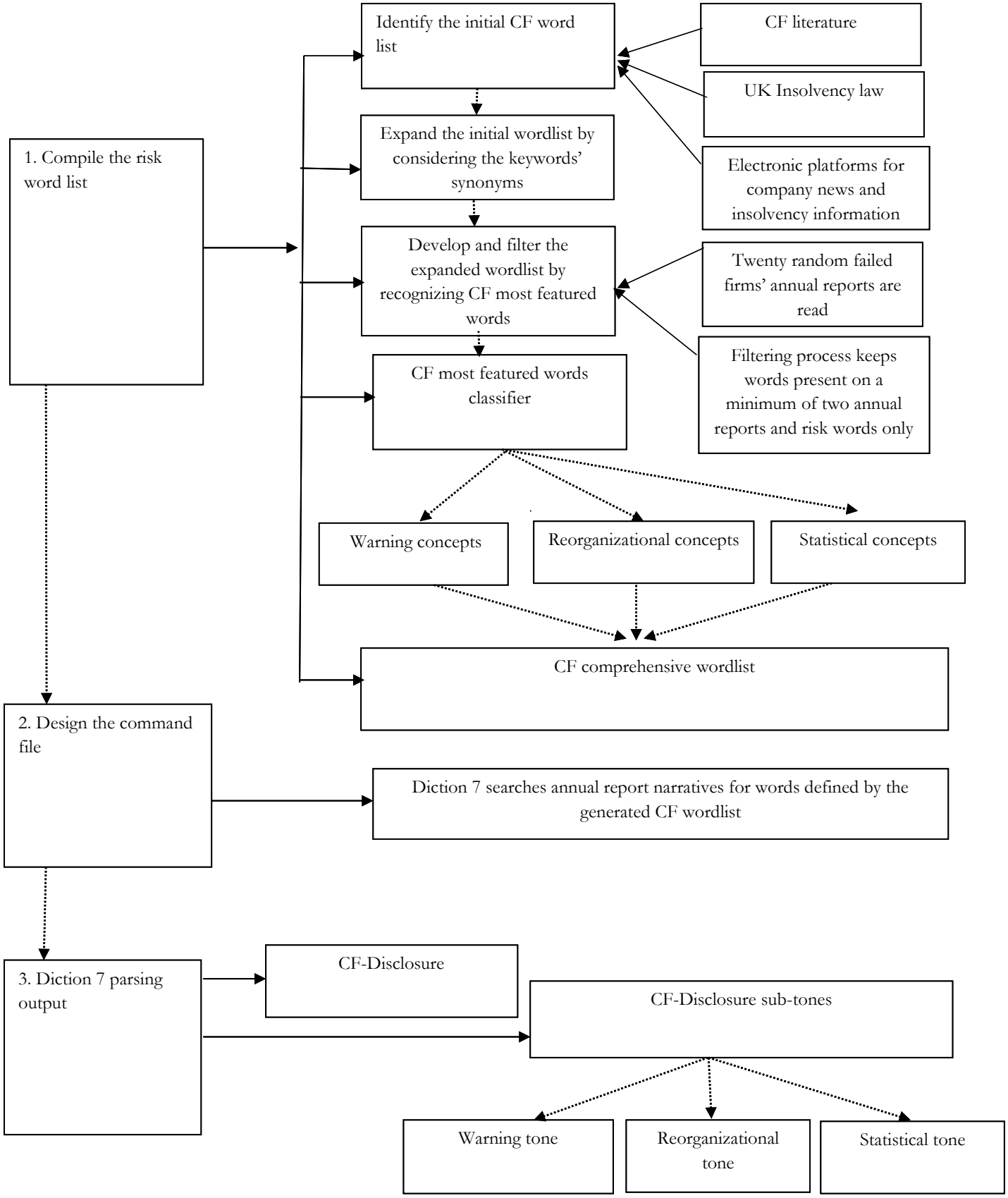
(Elshandidy and Shrives, 2016). It is, therefore, concluded that the computed *CF-Disclosure* is reliable. To ensure the validity of our measure, we introduce Appendix 2.C where we show how our wordlist performs in predicting two major collapses in the UK market in 2018-2019 (the cases of Carillion PLC and Thomas Cook PLC).

2.5.2.2. Control variables

Consistent with prior research (e.g., Charitou et al., 2004; Christidis and Gregory, 2010; Campbell et al., 2008; Tinoco and Wilson, 2013; Hsu and Wu, 2014; Darrat et al., 2016), we control for accounting-based variables (profitability, liquidity, leverage and performance). These are *ROA* (profitability) = net income/total assets, *Current Ratio* (liquidity) = current assets/ current liabilities, *Capital Structure* (leverage) = total debt/total equity capital, *Funds from Operations* (performance) = total funds from operations/total liabilities. Consistent with prior research, the present study expects that firms with higher profitability, liquidity and performance have a lower probability of failure, whereas higher leverage raises the possibility of failure.

We further control for market and macroeconomic-based variables following prior research (e.g., Agarwal and Taffler, 2008; Campbell et al., 2008; Christidis and Gregory, 2010; Tinoco and Wilson, 2013; Darrat et al., 2016). The market-based control variables are: *PRICE* = log firm's equity price, *Abnormal Returns* = the firm's cumulative annual returns minus the FTSE All Share return index for the same period of time, *Market Cap* = log the firm's market capitalization relative to the total market capitalization of the FTSE All Share index, *MB* = market value equity to book value equity and the *Volatility* of market returns is used as a measure of total risk, which is in turn measured by the standard deviation (sigma). Then, we add these two macroeconomic-based variables: the Retail Price Index (*RPI*) in base 100 as a measure of inflation rate in addition to the 3-Treasury Bill Rate (*TBR*) as a proxy for interest rates. Following the aforementioned studies, the present study expects that firms with larger market capitalization, higher stock price, abnormal stock returns and lower volatility, while market value is unusually low relative to book value, during lower levels of inflation and/or interest rate, are less likely to fail.

Figure 2.1. Textual analysis procedures to capture CF-Disclosure



This figure describes the three main steps taken to generate CF-Disclosure and CF-Disclosure sub-tones. A detailed discussion can be found in Section 2.5.2.1.

Additionally, we control for a number of different possible corporate governance variables that are broadly used in previous CF research (e.g., Daily and Dalton, 1994, 1995; Fich and Slezak, 2008; Platt and Platt, 2012; Hsu and Wu, 2014; Darrat et al., 2016). These variables include *Board Size* as measured by the log of the total number of board members, *Board Independence* as the proportion of independent non-executive directors to the board size, *CEO Turnover* as a dichotomous variable coded as one if the firm experienced a change in CEO and zero otherwise, *CEO Duality* as a dummy variable set to one if the CEO is also chairman of the board of directors or the executive chairman is present on the board and zero otherwise, and *Board Diversity* as captured by the proportion of female directors on the board of directors. Following the above-mentioned studies, the present study expects a negative (positive) relationship between board size, board independence, and board gender diversity (CEO turnover, and CEO duality) and the likelihood of CF.

Table 2.1 reports summary statistics for all explanatory variables for the final sample, which consists of 3,941 firm-year observations (272 healthy firms with 2,371 firm-year observations and 272 failed firms with 1,570 firm-year observations). Panels A, B and C of Table 2.1 present the descriptive statistics for the entire dataset, healthy firms and failed firms, respectively. To mitigate the outlier statistical problem, all continuous variables are winsorized at 1% on both tails (Shumway, 2001). The t-test statistics suggest that the means of all explanatory variables, except MB, are significantly different between the healthy and failed firms.[15] Table 2.2 displays the pair-wise correlations, where Pearson product moment correlations are displayed above the diagonal and Spearman rank-order correlations are displayed below. Collectively, *CF* is significantly correlated with the predicted signs with most control variables, where *CF* is coded as one if the firm is classified as failed and zero otherwise. Specifically, the *CF* variable is positively correlated with *CF-Disclosure* ($p < 0.01$). We also note that there is a positive correlation ($p < 0.01$) between

[15] Since multivariate analysis provides a better basis for drawing inferences related to the extent to which CF-Disclosure predicts CF and whether CF-Disclosure incrementally predicts CF over the classical CF prediction variables (e.g., Mayew et al., 2015), we turn our inferences to multivariate analyses, discussed later.

the level of aggregate *CF-Disclosure* and its sub-tones (untabulated for brevity), which thereby suggests that UK non-financial publicly quoted firms employ the tone in narrative-related disclosures to communicate their effort to face the probable failure or to convey a warning message about the CF likelihood.[16]

Table 2.1.
Descriptive statistics

Panel A: Entire data set

Variable	Obs.	Mean	S.D.	Median	Q1	Q3
Accounting, market and macroeconomic control variables (serve as a base model):						
ROA	3941	-3.812	28.220	4.400	-4.950	9.010
Current Ratio	3941	2.458	3.385	1.450	0.990	2.360
Capital Structure	3941	25.255	31.896	17.940	0.330	39.030
Funds from Operation	3941	-0.132	1.212	0.138	-0.021	0.281
PRICE	3941	4.352	1.797	4.554	3.314	5.587
Market Cap	3941	6.938	0.559	6.930	6.715	7.173
Abnormal Returns	3941	0.159	13.505	-0.775	-6.652	5.759
MB	3941	2.429	4.285	1.560	0.880	2.890
Volatility	3941	0.497	0.247	0.435	0.316	0.626
TBR	3941	2.713	2.174	3.871	0.389	4.746
PRI	3941	213.288	27.711	208.500	188.200	242.000
CF- Disclosure (explanatory variable):						
CF-Disclosure	3941	2.527	0.385	2.517	2.254	2.783
Corporate governance control factors:						
Board Size	3941	1.834	0.335	1.792	1.609	2.079
Board Independence	3941	0.347	0.234	0.400	0.167	0.500
CEO Turnover	3941	0.103	0.304	0.000	0.000	0.000
Duality Role	3941	0.285	0.451	0.000	0.000	1.000
Gender Diversity	3941	0.051	0.093	0.000	0.000	0.100

	Panel B: Healthy firms				**Panel C: Failed firms**				Difference
Variable	Obs.	Mean	S.D.	Median	Obs.	Mean	S.D.	Median	t-statistics
ROA	2371	3.196	17.409	6.110	1570	-14.395	36.821	-1.510	20.115***
Current Ratio	2371	2.345	2.971	1.530	1570	2.629	3.922	1.335	-2.587***
Capital Structure	2371	23.706	26.843	18.110	1570	27.595	38.174	17.730	-3.753***
Funds from Operation	2371	0.074	0.923	0.180	1570	-0.443	1.497	0.034	13.394***
PRICE	2371	4.679	1.600	4.840	1570	3.857	1.958	4.052	14.441***
Market Cap	2371	6.983	0.489	6.958	1570	6.869	0.646	6.882	6.290***
Abnormal Returns	2371	0.709	11.645	-0.548	1570	-0.671	15.875	-1.380	3.143***

[16] In addition, the correlation coefficients for both independent and control variables that are included in the logit analyses are also used to diagnose multicollinearity (untabulated). With Variance Inflation Factor (VIF) statistics less than 10 (or its alternate tolerance (TOL) statistics above 0.1), the unreported tests suggest that multicollinearity is not inherent in our logit regressions (Field, 2013). All unreported results are available upon request.

MB	2371	2.474	3.719	1.620	1570	2.360	5.021	1.425	0.816
Volatility	2371	0.429	0.213	0.374	1570	0.599	0.259	0.563	-22.515***
TBR	2371	2.278	2.164	0.501	1570	3.370	2.020	4.476	-15.911***
PRI	2371	218.834	28.748	222.700	1570	204.911	23.733	199.900	15.929***
CF-Disclosure	2371	2.495	0.379	2.493	1570	2.574	0.390	2.549	-6.268***
Board Size	2371	1.869	0.320	1.792	1570	1.781	0.349	1.792	8.221***
Board Independence	2371	0.371	0.225	0.400	1570	0.310	0.243	0.333	8.177***
CEO Turnover	2371	0.083	0.276	0.000	1570	0.134	0.341	0.000	-5.133***
Duality Role	2371	0.274	0.446	0.000	1570	0.301	0.459	0.000	-1.847*
Gender Diversity	2371	0.056	0.097	0.000	1570	0.044	0.085	0.000	3.974***

This table presents summary statistics for all independent variables and scores over the period 2000 to 2016. The entire sample of 544 firms comprises 272 failed firms matched with 272 healthy firms. *ROA* is the return on assets as a measure of firm profitability = net income/total assets. *Current Ratio* is a measure of firm liquidity = current assets/current liabilities. *Capital Structure* is measured by firm leverage = total debt/total equity. *Funds from Operation* is a measure of firm performance = total funds from operations/total liabilities. *PRICE* is measured as the log of firm's equity price. *Market Cap* measures the firm's relative value as the log of the firm's market capitalization relative to the total market capitalization of the FTSE All Share index. *Abnormal Returns* represents the firm's cumulative annual returns minus the FTSE All Share return index for the same period of time. *Volatility* is the sigma of market returns used as a measure of total risk, which is in turn measured by the standard deviation. *MB* is market to book ratio = market value equity/book value equity. *RPI* is the Retail Price Index (RPI) in base 100 as a measure of the inflation rate. *TBR* is the 3-Treasury Bill Rate as a proxy for interest rates. *CF-Disclosure* is the aggregate information regarding CF, measured by the percentage of words that indicate the likelihood of CF in the narrative sections of annual reports. *Board Size* is measured by the log of the total number of board of directors. *Board Independence* is measured by the proportion of independent non-executive directors to the board size. *CEO Turnover* is a dichotomous variable coded as one if the firm experienced a change in CEO and zero otherwise. *Duality Role* is a dummy variable set to one if the CEO is also chairman of the board of directors or executive chairman presents on the board and zero otherwise. *Gender Diversity* is measured by the proportion of female directors on the board of directors. In addition, for these variables, t-statistics report the differences between healthy and failed firms. *, ** and ***indicate significance at the 0.1, 0.05 and 0.01 levels, respectively. All continuous variables are winsorized at 1% on both tails.

Table 2.2.
Pearson (top) and Spearman (bottom) correlation coefficients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 CF		**-0.283**	**0.034**	**0.058**	**-0.188**	**-0.226**	**-0.113**	**-0.043**	-0.015	**0.214**	0.025	**0.038**	**0.208**	**-0.167**	**-0.115**	**0.094**	0.015	-0.025
2 ROA	**-0.273**		**-0.069**	-0.024	**0.536**	**0.292**	**0.153**	**0.043**	**-0.101**	**-0.432**	**-0.038**	0.017	**-0.203**	**0.263**	**0.216**	**-0.086**	**-0.053**	**0.103**
3 Current Ratio	**-0.064**	**0.055**		**-0.271**	**-0.468**	**-0.139**	**0.048**	0.002	-0.015	**0.123**	0.005	0.017	**-0.067**	**-0.140**	**-0.150**	**-0.038**	0.022	**-0.068**
4 Capital Structure	-0.020	**0.048**	**-0.498**		**0.113**	**0.087**	**-0.066**	-0.019	**-0.052**	**-0.048**	**0.051**	**-0.053**	**0.076**	**0.144**	**0.131**	**0.066**	-0.015	0.011
5 Funds from Operation	**-0.256**	**0.739**	**0.119**	**-0.095**		**0.289**	**0.055**	0.012	**-0.092**	**-0.322**	**-0.056**	**0.039**	**-0.085**	**0.226**	**0.235**	-0.024	-0.031	**0.100**
6 PRICE	**-0.209**	**0.424**	**-0.045**	**0.178**	**0.357**		**-0.033**	-0.023	**0.188**	**-0.469**	0.028	-0.010	**-0.210**	**0.458**	**0.351**	-0.028	-0.028	**0.104**
7 Market Cap	**-0.115**	**0.176**	**0.045**	-0.028	**0.141**	-0.003		**0.163**	**-0.146**	**-0.040**	**-0.120**	0.005	**-0.154**	**0.053**	0.007	**-0.062**	**0.051**	0.015
8 Abnormal Returns	**-0.045**	**0.090**	0.015	-0.011	**0.075**	0.005	**0.148**		-0.031	0.024	**-0.128**	**0.080**	0.014	-0.009	0.020	**-0.033**	-0.009	**0.050**
9 MB	**-0.083**	**0.221**	**0.053**	**0.047**	**0.144**	**0.387**	**-0.172**	**-0.058**		-0.003	0.016	0.002	**-0.055**	**0.082**	**0.049**	-0.020	**-0.034**	**0.056**
10 Volatility	**0.209**	**-0.453**	0.010	**-0.160**	**-0.399**	**-0.520**	**-0.076**	-0.029	**-0.212**		-0.025	**-0.037**	**0.235**	**-0.346**	**-0.262**	**0.075**	**0.099**	**-0.145**
11 TBR	**0.047**	-0.012	-0.018	**0.059**	**-0.085**	0.005	**-0.144**	**-0.129**	**0.061**	-0.018		**-0.848**	**-0.315**	0.022	**-0.127**	0.011	**0.092**	**-0.190**
12 RPI	**0.053**	0.008	**0.045**	**-0.078**	**0.054**	-0.004	0.016	**0.101**	**-0.036**	**-0.041**	**-0.768**		**0.356**	**-0.059**	**0.125**	0.021	**-0.110**	**0.232**
13 CF-Disclosure	**0.198**	**-0.308**	**-0.144**	**0.050**	**-0.278**	**-0.204**	**-0.145**	0.013	**-0.160**	**0.233**	**-0.283**	**0.375**		**-0.199**	-0.001	**0.100**	-0.020	**0.062**
14 Board Size	**-0.151**	**0.268**	**-0.105**	**0.229**	**0.211**	**0.464**	**0.068**	0.025	**0.205**	**-0.365**	0.018	**-0.072**	**-0.193**		**0.377**	0.007	**-0.089**	**0.144**
15 Board Independence	**-0.109**	**0.234**	**-0.087**	**0.213**	**0.211**	**0.346**	0.017	**0.052**	**0.107**	**-0.266**	**-0.136**	**0.137**	0.016	**0.360**		0.021	**-0.202**	**0.186**
16 CEO Turnover	**0.094**	**-0.107**	**-0.032**	0.026	**-0.078**	-0.028	**-0.059**	**-0.034**	**-0.041**	**0.076**	0.005	0.021	**0.096**	0.011	0.020		0.004	0.016
17 Duality Role	0.015	**-0.065**	-0.023	**-0.036**	-0.018	-0.026	0.030	-0.027	**-0.084**	**0.088**	**0.078**	**-0.114**	-0.017	**-0.100**	**-0.209**	0.004		**-0.067**
18 Gender Diversity	**-0.039**	**0.146**	**-0.051**	**0.064**	**0.116**	**0.163**	0.027	**0.056**	**0.112**	**-0.181**	**-0.197**	**0.225**	**0.060**	**0.216**	**0.226**	0.008	**-0.073**	

This table reports the correlation coefficients for regression variables. Bold text indicates significance based on two-tailed t-tests, at the 0.05 level or better. All continuous variables are winsorized at 1% on both tails. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

2.5.3. The empirical model

To estimate a multi-period (i.e., dynamic) logit model, we (following: Shumway, 2001; Chava and Jarrow, 2004; Campbell et al., 2008; Tinoco and Wilson, 2013; Darrat et al., 2016) employ a binary indicator of CF. The *CF* indicator is given a value of one if the company is classified as failed and zero otherwise. As pointed out earlier, we establish our analysis on both approaches to failure, i.e., the financial approach and the legal approach. Since there are multiple observations of the same firm, following Petersen (2009), we employ robust standard errors estimation and adjust standard errors clustered by firm. The present study's multi-period logit model is given by the following formula:

$$P_{i,t} = \frac{1}{1 + \exp(-y_{i,t})} \; Where,$$

$$\mathrm{y}_{i,t} = \alpha + \beta' X_{i,t-1} = \alpha + \beta' \begin{bmatrix} X_{1,t-1} & \cdots & X_{1,t-j} \\ \vdots & \ddots & \vdots \\ X_{n,t-1} & \cdots & X_{n,t-j} \end{bmatrix}. \quad (2.1)$$

$P_{i,t}$ denotes the conditional probability in time t that the firm i will fail within one year. This conditional probability is based on the observed value of $\mathrm{y}_{i,t}$, which is a linear set of the independent variables. $X_{1,t-1}$ denotes the value of the first independent variable at the year that immediately precedes *CF*, and so on. As a result, conditional on the observed values of our predictors, the multi-period logit model predicts the probability of *CF* during a year. Following prior studies (e.g., Tinoco and Wilson, 2013; Darrat et al., 2016), we estimate the probability of CF for one year and two years before the event of failure. The model description is identical when predicting for two years prior to *CF*.

2.6. Empirical Results and Discussion

2.6.1. Empirical results

Panel A of Table 2.3 reports the results of logit regression models for examining the ability of *CF-Disclosure* to predict CF in a year and two years prior to CF, respectively. To that end, in one

year and two years prior to CF, we introduce first Model 1 and Model 5 that give the impact of accounting, market and macroeconomic variables, as the base model, on CF. In one year before the CF, the results suggest that firms with larger market capitalization, higher profitability and stock prices, as well as lower leverage and volatility during low levels of inflation and interest rates are less likely to fail than other firms. In two years prior to CF, the signs of coefficients are not changed and results remain at the 1% significance level, except leverage and market capitalization, where significance is decreased to 5%, and abnormal returns, which becomes negatively significant at the 10% level. These results are consistent with our expectations and prior CF literature (e.g., Tinoco and Wilson, 2013).

The following models report the *CF-Disclosure* estimates in a sequential fashion showing the incremental predictive ability of *CF-Disclosure* relative to the base model predictors. Following prior research (e.g., Chava and Jarrow, 2004; Campbell et al., 2008; Mayew et al., 2015), we, in a first round, also show the incremental explanatory ability and predictive accuracy using the McFadden Pseudo R^2 (Pseudo R^2) in addition to the p-values of the both Wald Chi-squared test (Wald χ^2 Test) and likelihood ratio test statistics (LRT). As a first step, we investigate the role of our main variable of interest, *CF-Disclosure*, alone. In Model 2 and Model 6 in a year and two years prior to CF, *CF-Disclosure* is significant at the 1% level (Z-statistics are 10.150 and 7.301, respectively). In addition, the Pseudo R^2 statistics suggest that *CF-Disclosure* alone has predictive accuracy and provides explanatory power of about 41% (0.069 under Model 2 / 0.167 under Model 1) and 25% (0.040 under Model 6 / 0.160 under Model 5) relative to that provided by accounting, market and macroeconomic variables combined.[17] This implies the feasible predictive ability of *CF-Disclosure* as compared to the CF predictors widely used in the classical models.

In Model 3 and Model 7, representing our expanded model, *CF-Disclosure* is added as the key explanatory variable to the variables of the base model. In both models in a year and two years

[17] Caution should be exercised in interpreting the Pseudo R^2. However, its values are comparable and indicative when the evaluated models have the same dataset context and outcome variable.

prior to CF, *CF-Disclosure* is significant at the 1% level (Z-statistics are 6.811 and 4.655, respectively). To put this in an economic perspective, we estimate the average marginal effects (unreported).[18] With a standard deviation of 0.385, the marginal effects of the *CF-Disclosure* are 0.097 and 0.076 in the year preceding the CF and the penultimate year, respectively. That is, other things being equal, a one-standard-deviation increase in the *CF-Disclosure* is associated with a 39.7% (0.097 * 0.385 / CF binary dependent sample mean of 0.094) greater likelihood of CF within a year. Similarly, a one-standard-deviation increase in the *CF-Disclosure* is associated with a 31.9% greater likelihood of CF within two years. Thus, the presence of more CF-related words in the annual report narratives is associated with a higher probability of CF in the first or second following year. These results support the study's hypothesis.

These results are consistent with signaling and legitimacy theories as where a firm's solvency is in question, managers are motivated to signal threats to the firm's legitimacy in order to formulate a normalizing account, perform strategic restructuring, mitigate information asymmetry, reduce stakeholders' responses and lessen litigation and reputational risks. Furthermore, our findings support previous arguments (e.g., Holder-Webb and Cohen, 2007) that annual report narratives provide the official channel for managers to disclose potential CF to stakeholders. These results confirm prior studies' (e.g., Ohlson, 1980; Shuai and Li, 2005) call for the recognition of qualitative variables to enhance the predictive power of CF models.

Furthermore, the Pseudo R^2 statistics in addition to the p-values of the both Wald χ^2 Test and LRT report the significance of incorporating the *CF-Disclosure* variable into the traditional base model. Relative to the base model (Models 1 and 5), the p-values reported under Model 3 and Model 7 for one year and two years prior to CF, respectively, indicate the high significance of *CF-Disclosure* at the 1% level. Besides, the enhancement in Pseudo R^2 statistic by about 16% (from 0.167 for Model 1 to 0.193 for Model 3) for the year prior to CF, as well as by about 9% (from

[18] Marginal effects are the average of discrete or partial changes in the quantities of interest (i.e., the probability of CF) evaluated for each observation (Bartus, 2005).

0.160 for Model 5 to 0.174 for Model 7) for the two years prior to CF underscores the incremental explanatory ability of *CF-Disclosure*.

Taken all together, these findings empirically indicate that annual report narratives are an important factor in predicting the likelihood of CF. The theoretical implications of this finding contribute in enriching the continuing discussion about the usefulness of information conveyed in annual report narratives (e.g., Elshandidy et al., 2018) by underscoring its importance in predicting CF and improving or revising CF classical prediction models. These implications are also extended to the auditors to strengthen audit's analytical review, especially for the sake of going concern reporting. In addition, the results have practical implications for investors and other market participants who are likely to look for early warning alerts of CF. In Models 3 and 7, the control variables that are included in the base model retain their statistical significance, except capital structure and market capitalization, which become significant at the 5% and 10% levels in one year and two years prior to CF, respectively.

Model 4 and Model 8 include further corporate governance factors (*board size, board independence, CEO turnover, duality role and gender diversity*), which were of interest in previous CF studies such as Daily and Dalton (1994, 1995), Fich and Slezak (2008), and Hsu and Wu (2014). This inclusion is important to revise our results from possible endogeneity attributable to omitted variables (Darrat et al., 2016), as well as considering the influence of conventional corporate governance factors that appear in the prior CF literature. The exhibited models for one year and two years prior to CF indicate, as before, that the positive relationship between *CF-Disclosure* and the likelihood of CF remains highly significant with a stable Z-statistic at the 1% level, even in the presence of corporate governance attributes. Thus, this finding suggests that the present study's key variable of *CF-Disclosure* is a powerful and consistent predictor over time of the possibility of CF. Regarding corporate governance control variables, interestingly none is statistically significant in its association with the likelihood of CF, either for the penultimate year or the year preceding the CF. Only for one-year prior to CF, *CEO Turnover* is statistically significant at the 5% level (Z-

statistic of 2.435), which suggests that CEO instability increases for failed firms (Daily and Dalton, 1995). In sum, the observed corporate governance results are consistent with the findings of Hsu and Wu (2014) related to board composition in the UK context.

Panel B of Table 2.3 displays a comparison of model performance statistics from the base model (Model 1 and Model 5 in panel A) and the expanded model that includes *CF-Disclosure* (Model 3 and Model 7 in panel A) as estimated in a year and two years prior to CF. Following prior CF research (e.g., Chava and Jarrow, 2004; Agarwal and Taffler, 2008; Tinoco and Wilson, 2013; Darrat et al., 2016) this chapter employs five widely used measures to assess the model's fit and predictive ability: Pseudo R^2 (reported under panel A), Wald χ^2 Test, Hosmer and Lemeshow goodness-of-fit test (H&L Test), LRT and Area Under the Receiver Operating Characteristic (ROC) Curve (AUC).

Typically, the higher absolute values of the Pseudo R^2 statistic, as a proportion of change in terms of the log likelihood, imply that the model, as a whole, provides a superior fit to the data. The Wald χ^2 Test restricts the parameters of interest to zero and checking if the fit of the model is significantly reduced. Similarly, LRT compares the difference between the nested models. Accordingly, if the difference is statistically significant, it is indicative that the unconstrained model statistically fits the data better than the constrained model; thus, including the variables is imperative. AUC gauges the discriminating ability and accuracy of the model relative to the perfect model with a value of 1. AUC shows the probability of detecting true and false outcomes for an entire range of possible cut-points. Thus, it is a complete and leading measure to assess the model's ability to discriminate between the subjects of the binary outcomes, with a higher score suggesting better predictive ability (Hosmer et al., 2013). In the H&L Test the sample is divided up, as is commonly done (e.g., Tinoco and Wilson, 2013), into ten groups (g) based on the predicted probabilities. For this partition, the Pearson chi-square statistic compares the predicted frequency

and the observed frequency. Thus, the more closely these frequencies match, the better fitted is the model to predict the binary outcome (i.e., CF) (Agresti, 2002).[19]

With the exception of the H&L Test statistics, panel B of Table 2.3 shows that both base and expanded models have significant performance in predicting CF for a year and two years before CF. However, the superior statistics for the expanded model (relative to the base model) clearly indicate that adding the *CF-Disclosure* variable contributes positively and significantly to the performance of the CF prediction models (the AUC of the model contains *CF-Disclosure* alone is virtually 85% of the base model). This, in other words, also means that it is preferable to consider *CF-Disclosure* alongside the traditional accounting, market and macroeconomic variables in order to increase the CF prediction ability.

In terms of H&L Test statistics, in t - 1, the large chi-square (14.710) with a p-value slightly above 0.05 implies that the base model hardly fits the data. In t - 2, the chi-square exceeds 15 and the p-value is significantly lower than 0.05, obviously suggesting that the base model does not fit well. This, in turn, implies that the base model lacks other explanatory variables needed to accurately discriminate between the binary response (i.e., the *CF*). Turning to the expanded model, in both t - 1 and t - 2, the small chi-square (<15) and the large p-value (>0.05) clearly suggest that the model fit is good. Therefore, it can be concluded that incorporating the *CF-Disclosure* variable significantly assists the traditional variables in adequately discriminating between failed and healthy firms and better predicting CF. We also check the external validity of our multi-period logit model by undertaking an out-of-sample-period *ex-ante* test (Charitou et al., 2004). Our validation sample takes place in the 2011-2016 period. In t -1 and t - 2, the predictive ability of the base model is 73.80% and 72.66%, and of the expanded model is 76.22% and %74.71%, respectively.

[19] The H&L Test statistic approximately follows a chi-squared distribution with g−2 degrees of freedom and a good fit yields a large p-value. Therefore, a small chi-square (<15) and a large p-value (>0.05) indicate that the model fits the data well (Tinoco and Wilson, 2013).

Table 2.3.
Logit regressions and model performance measures
Panel A: Logit regression of CF indicator on CF-Disclosure, corporate governance and complete predictor variables

VARIABLES	One year prior to CF					Two years prior to CF				
	Model 1	Model 2	Model 3	Model 4	*'Further'*	Model 5	Model 6	Model 7	Model 8	*'Further'*
ROA	-0.011***		-0.011***	-0.010***	-0.010***	-0.014***		-0.014***	-0.014***	-0.014***
	(-5.041)		(-5.508)	(-5.113)	(-5.159)	(-5.778)		(-6.153)	(-6.009)	(-6.014)
Current Ratio	-0.002		0.011	0.011	0.009	0.003		0.014	0.014	0.014
	(-0.086)		(0.584)	(0.580)	(0.484)	(0.141)		(0.641)	(0.624)	(0.612)
Capital Structure	0.005***		0.004**	0.004**	0.004**	0.004**		0.003*	0.004*	0.004*
	(2.903)		(2.326)	(2.497)	(2.528)	(2.304)		(1.783)	(1.892)	(1.890)
Funds from Operation	-0.081		-0.093	-0.088	-0.105*	-0.055		-0.059	-0.060	-0.063
	(-1.285)		(-1.550)	(-1.459)	(-1.722)	(-0.800)		(-0.878)	(-0.901)	(-0.935)
PRICE	-0.252***		-0.221***	-0.198***	-0.190***	-0.219***		-0.202***	-0.200***	-0.199***
	(-5.146)		(-4.683)	(-4.199)	(-4.008)	(-4.450)		(-4.216)	(-4.215)	(-4.186)
Market Cap	-0.348***		-0.234**	-0.229**	-0.208**	-0.274**		-0.188*	-0.181	-0.180
	(-3.340)		(-2.249)	(-2.182)	(-1.994)	(-2.494)		(-1.708)	(-1.644)	(-1.641)
Abnormal Returns	-0.003		-0.003	-0.003	-0.003	-0.009*		-0.008*	-0.008*	-0.008*
	(-0.855)		(-0.872)	(-0.874)	(-0.841)	(-1.736)		(-1.724)	(-1.724)	(-1.726)
MB	-0.017		-0.010	-0.008	-0.008	0.001		0.007	0.007	0.007
	(-1.210)		(-0.726)	(-0.587)	(-0.581)	(0.077)		(0.553)	(0.549)	(0.541)
Volatility	1.178***		0.943***	0.866***	0.868***	1.141***		0.944***	0.995***	0.995***
	(3.882)		(3.290)	(2.992)	(3.007)	(3.727)		(3.206)	(3.271)	(3.269)
TBR	0.307***		0.328***	0.311***	0.302***	0.401***		0.422***	0.421***	0.419***
	(5.297)		(5.758)	(5.440)	(5.397)	(7.297)		(7.665)	(7.658)	(7.592)
RPI	0.027***		0.022***	0.021***	0.017***	0.033***		0.031***	0.031***	0.030***
	(5.985)		(5.049)	(4.749)	(3.632)	(7.101)		(6.638)	(6.419)	(5.857)
FC-proxy					2.432***					0.300
					(3.119)					(0.347)
CF-Disclosure		1.857***	1.362***	1.308***	1.011***		1.427***	0.988***	1.011***	0.974***

		(10.150)	(6.811)	(6.682)	(4.757)		(7.301)	(4.655)	(4.789)	(4.112)
Board Size				-0.358	-0.357				0.243	0.239
				(-1.240)	(-1.231)				(0.870)	(0.856)
Board Independence				-0.311	-0.310				-0.491	-0.492
				(-0.949)	(-0.929)				(-1.413)	(-1.414)
CEO Turnover				0.460***	0.464***				0.168	0.168
				(2.870)	(2.894)				(0.816)	(0.815)
Duality Role				-0.122	-0.112				-0.142	-0.141
				(-0.759)	(-0.692)				(-0.906)	(-0.899)
Gender Diversity				0.557	0.676				0.675	0.698
				(0.679)	(0.823)				(0.768)	(0.799)
Constant	-6.477***	-7.164***	-9.972***	-8.956***	-8.471***	-8.600***	-5.863***	-11.250***	-11.650***	-11.530***
	(-4.111)	(-14.193)	(-6.057)	(-5.098)	(-4.789)	(-5.385)	(-11.215)	(-6.482)	(-6.376)	(-6.221)
Observations	3,941	3,941	3,941	3,941	3,941	3,441	3,441	3,441	3,441	3,441
LRT (p-value)			< 0.001					< 0.001		
Wald χ^2 Test (p-value)			< 0.001	< 0.001	< 0.001			< 0.001	< 0.001	< 0.001
Pseudo R^2	0.167	0.069	0.193	0.198	0.203	0.160	0.040	0.174	0.177	0.177
Panel B: Model performance measures										
Wald χ^2 Test:										
χ^2 [11,12,11,12][a]	292.300		353.170			240.510		287.530		
(p-value)	< 0.001		< 0.001			< 0.001		< 0.001		
H&L Test:										
χ^2 [8][a]	14.710		4.710			16.880		13.06		
(p-value)	0.065		0.789			0.031		0.1100		
LRT:										
χ^2 [1][a]			64.650					21.670		
(p-value)			< 0.001					< 0.001		
AUC[b]	0.808	0.696	0.819	0.817	0.820	0.797	0.648	0.800	0.808	0.808
External validity	0.738		0.762			0.727		0.747		

Panel A of this table reports the results from logit CF prediction models. The *'Further'* model reports the results of further analysis inspecting the role of financial constraints. *FC-proxy* is the percentage of words that indicate financial constraints in annual reports narratives. LRT is the likelihood ratio test statistics between the Base Model and the Expanded Model that includes *CF-Disclosure* in one and two years prior to CF (i.e., Model 1 and Model 3, and Model 5 and Model 7, respectively). Wald χ^2 Test represents the significance of including the *CF-Disclosure* parameter in the model. Robust standard errors are adjusted for clustering at the firm level. Z-statistics are in parentheses. Significance level: *** $p<0.01$, ** $p<0.05$ and * $p<0.1$. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

The performance statistics of Base Model (1 and 5) and Expanded Model (3 and 7) are reported in Panel B for a year and two years prior to CF. Pseudo R^2 (reported under Panel A), Wald χ^2 Test and H&L Test are calculated individually for each model. In terms of H&L Test, each model's covariates are tested under the criteria that a small chi-square (<15) and a large p-value (>0.05) infer that the model fits the covariates well so that it can be employed appropriately to predict the binary outcome (i.e., CF). LRT is the likelihood ratio test statistics between the base and the complete models in a year and two years prior to CF. The AUC measures the model power to discriminate between failed and healthy firms with a higher score suggesting improved predictive ability. External validity reports models' predictive ability using an out-of-sample-period *ex-ante* test. [b] For comparison purpose, AUC reports the area under the curve for the four models using the same observations under H0: the under-curves areas are equal. The overall p-value <0.001 for the four models, as well as models in t - 1 and t - 2 demonstrates the strong rejection of the null hypothesis. AUC of other models is also denoted. [a] The degrees of freedom for each estimated model are represented in brackets.

2.6.2. Further analysis

Motivated by the present study's theoretical foundation, in addition to considering the difficulty in distinguishing financial constraints from CF in some of the previous research (Whited and Wu, 2006), we investigate whether financial constraints would promote the incidence of *CF*. We thus use Bodnaruk et al.'s (2015) financial constraints wordlist to calculate the percentage of words that indicate financial constraints in annual reports narratives (i.e., *FC-proxy*).[20] The '*Further'* models of Table 2.3 illustrate that failed firms suffer severely from financial constraints in the year that directly precedes the failure (Z-statistic is 3.119 at the 1% significance level). The variable's unreported marginal effect of 0.170 indicates that it has a non-trivial economic impact on CF (18.9%). However, in two years prior to the CF, the *FC-proxy* statistically shows an insignificant role in the CF. Simultaneously, *CF-Disclosure* is significantly associated with the probability of CF in both the year that directly precedes the CF (Z-statistic is 4.757 at the 1% significance level; economically 28.7%) and the penultimate year (Z-statistic is 4.112 at the 1% significance level; economically 30.3%). These results, consequently, confirm our supposition that a financially distressed firm becomes more vulnerable when financial constraints take place, which as a result, would promote the incidence of CF. In the same context, this evidence provides empirical support to prior research (e.g., Senbet and Wang, 2012) showing that a firm can be financially distressed without being financially constrained.

2.6.3. Robustness checks

We validate our findings and test the robustness in various ways. First, to account for the effect of the recent financial crisis (2007-2008), we employ dummy variables for the periods prior, during and post the crisis. Based on Models 1 and 2 of Table 2.4, the results suggest that the probability of failure has significantly increased both during and after the crisis relative to before the crisis. Yet, our earlier findings individually and collectively remain strongly consistent. These

[20] The multicollinearity (unreported) tests suggest that the predictors remain independent and do not suffer this problem after adding *FC-proxy*.

results are consistent with the UK's companies' insolvency records and the evidence of Agarwal and Taffler (2007) on growing bankruptcies in the UK.

Turning to Model 3 of Table 2.4, the coefficient estimates of *CF-Disclosure*, (*CF-Disclosure* + *CF-Disclosure*Crisis*) and (*CF-Disclosure* + *CF-Disclosure*PostCrisis*) report the sign and the significance of the relationship between *CF-Disclosure* and the likelihood of CF considering the impacts of the period pre, during and post-crisis, respectively. The evidence clearly indicates that *CF-Disclosure* is positively and significantly able to capture the probability of CF before, during and after the financial crisis at the 10-1% level of significance. Moreover, the positive and significant sums of the parameters of (*CF-Disclosure* + *CF-Disclosure*Crisis*) and (*CF-Disclosure* + *CF-Disclosure*PostCrisis*) indicate that firms increasingly use annual report narratives to communicate potential CF during and after the financial crisis (relative to before the financial crisis), respectively. To sum up, it can be argued that the annual report narrative-related disclosures imply a very strong alarm for CF with a 90-99% confidence level, before, during and after the financial crisis.[21]

Table 2.4.
Logit regression of CF indicator on complete predictor variables with the financial crisis effects

VARIABLES	One year prior to CF	Two years prior to CF	One year prior to CF
	Model 1	Model 2	Model 3
Crisis	0.980***	0.845***	0.521*
	(4.160)	(3.180)	(1.942)
PostCrisis	1.136***	0.634*	0.318
	(3.665)	(1.762)	(0.864)
CF-Disclosure	1.285***	1.016***	0.992***
	(6.580)	(4.835)	(4.303)
*CF-Disclosure*Crisis*			0.347***
			(3.014)
*CF-Disclosure*PostCrisis*			0.383*
			(1.758)
Constant	-6.306***	-10.363***	-4.349**
	(-3.362)	(-4.602)	(-2.021)
'*Base & CG controls*'	Included	Included	Included
Observations	3,941	3,941	3,941

[21] To verify this conclusion, we also employ the difference-in-differences test to investigate the significance of differences in *CF-Disclosure* between the failed and the healthy firms before, during and after the financial crisis. The unreported results are in line with our previous results at the 1% significance level. Notably, we run our test for the interactions between *CF-Disclosure* and crisis dummy variables for only one year before CF since going further would lead to incongruous inferences as the period of the financial crisis is only two years.

Pseudo R^2	0.207	0.182	0.212
AUC	0.820	0.810	0.822

This table reports the results from logit CF prediction models over the sample period 2000–2016 considering the financial crisis effects. Relative to the period before the crisis, *Crisis* (*PostCrisis*) is a dummy variable that takes a value of one for years 2007 and 2008 (years 2009 to 2016) and zero otherwise. In one year and two years prior to CF, Models 1 and 2 are estimated to examine the impact of the financial crisis on the ability of *CF-Disclosure* variable to predict CF. For Model 3, parameter estimates for *CF-Disclosure, CF-Disclosure*Crisis* and *CF-Disclosure*PostCrisis* indicate the link between CF-Disclosure and CF pre, during and post-crisis, respectively. '*Base & CG controls*' indicates the inclusion of accounting, market, macroeconomic, and corporate governance control variables shown in Model 4, Panel A of Table 2.3. Robust standard errors are adjusted for clustering at the firm level. Z-statistics are in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

Second, following Chava and Jarrow (2004), we validate our results by investigating the influence of industry effects. Thus, in Table 2.5 we run the logit models with an intercept and slope dummy variables for each specific industry grouping. Further, for one year and two years before CF, slope shifting dummies for *CF-Disclosure* are applied in Models 3 and 4 to test the link between the industry groupings and *CF-Disclosure*. Chava and Jarrow (2004) indicate that the original four-digit industry separation is too fine for estimation purposes. Therefore, we follow them and combine the four-digit SIC code into three unique groups as follows: *IND1* represents miscellaneous industries (SIC code is in the ranges 1–1000, 1500–1800, 5000–6000, 7000–8900), *IND2* represents manufacturing and mineral industries (SIC code is in the ranges 1000–1500, 2000–4000), and *IND3* represents transportation, communications and utilities (SIC code is in the range 4000–5000). In addition, as mentioned earlier, the finance, insurance and real estate sector (SIC code is in the range 6000-6999) is excluded from our analysis.

In Table 2.5, it is observed that the *CF-Disclosure* findings remain consistent with our original results discussed earlier. Focusing on Models 3 and 4 where *IND3* is employed as the base value, the resulting estimates report the significance of *IND1*. It is, therefore, suggested that *IND1* is the industry group most exposed to CF, followed by *IND2* and *IND3*, respectively. With respect to the interactions between *CF-Disclosure* and industry groups, *CF-Disclosure* is positively significant in all industry groups, suggesting that *CF-Disclosure* retains its predictive power to capture the probability of CF in all industry groups. Moreover, the signs and slope dummies illustrate that *CF-*

Disclosure is more sensitive to the likelihood of CF in *IND3* and *IND2*, respectively, compared to *IND1*.

Table 2.5.
Logit regression of CF indicator on complete predictor variables with the industry effects

VARIABLES	One year prior to CF	Two years prior to CF	One year prior to CF	Two years prior to CF
	Model 1	Model 2	Model 3	Model 4
IND1	-0.387	-0.464	5.938**	4.963*
	(-1.158)	(-1.263)	(2.256)	(1.796)
IND2	-0.634*	-0.683*	4.139	2.957
	(-1.847)	(-1.826)	(1.603)	(1.077)
CF-Disclosure	1.257***	0.949***	3.020***	2.402***
	(6.496)	(4.607)	(3.648)	(2.724)
*CF-Disclosure*IND1*			-2.180**	-1.921**
			(-2.481)	(-2.075)
*CF-Disclosure*IND2*			-1.608*	-1.241
			(-1.874)	(-1.354)
Constant	-8.200***	-10.824***	-13.426***	-15.043***
	(-4.477)	(-5.730)	(-4.466)	(-4.615)
'*Base & CG controls*'	Included	Included	Included	Included
Observations	3,941	3,441	3,941	3,441
Pseudo R^2	0.201	0.180	0.205	0.184
AUC	0.819	0.811	0.821	0.814

This table reports the results from logit CF prediction models with the inclusion of industry effects. Consistent with Chava and Jarrow (2004), Models 3 and 4 are estimated in one year and two years prior to CF, respectively. *IND1* represents miscellaneous industries (SIC code is in the ranges 1–1000, 1500–1800, 5000–6000, 7000–8900), *IND2* represents manufacturing and mineral industries (SIC code is in the ranges 1000–1500, 2000–4000)) and *IND3* represents transportation, communications and utilities (SIC code is in the range 4000–5000). '*Base & CG controls*' indicates the inclusion of accounting, market, macroeconomic, and corporate governance control variables shown in Model 4, Panel A of Table 2.3. Robust standard errors are adjusted for clustering at the firm level. Z-statistics are in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

Third, to further test the robustness of our results, we perform a univariate analysis for *CF-Disclosure* in order to determine its discriminating ability using the analysis of variance (ANOVA) F-test. We also conduct multiple discriminate analysis (MDA) to check the total significance of the expanded (and the base) discriminant model. The Wilks' lambda statistic in panel A of Table 2.6 suggests that *CF-Disclosure* is able to explain 4‰ (1 - 0.996) of the total variability between the failed and healthy firms.[22] In line with that, the F-test statistic suggests that *CF-Disclosure* has a high ability to discriminate between the failed and the healthy firms at the 1% significance level.

[22] The value of Wilks' lambda has a range from 0 to 1. A lower value of Wilks' lambda implies a greater ability to discriminate between the groups (i.e., between the failed and healthy firms). The after *CF-Disclosure* unexplained total variability (0.996) would probably, at the first glance, appear too large. However, this proportion is marginally larger

Table 2.6.
F-Test summary and Wilks' Lambda for CF-Disclosure, base and complete models, as well as the classification results

Panel A: The univariate analysis for the key variable CF-Disclosure				
Variable	Wilks' lambda	F	p-value	
CF-Disclosure	0.996	16.890	< 0.001	
Panel B: The multiple discriminate analyses for the overall significance of the discriminant models				
Model	Test of function(s)	Wilks' lambda	Chi-square	p-value
Base Model	1	0.772	1127.045	< 0.001
Expanded Model	1	0.767	1156.584	< 0.001

Panel A of this table reports the results of the analysis of variance (ANOVA) F-test for the *CF-Disclosure* key variable on an individual basis to test for the discriminating ability. Panel B reports the explanatory results as well as the significance resulting from the multiple discriminate analyses (MDA). Wilk's lambda is used to test the significance of the discriminant functions (i.e., the class centers separation in addition to the proportion of variance); when the value of Wilks' lambda for a function is small, the function is significant. F-test statistic is the ratio of variances. The Base Model incorporates the variables in Model 1, Panel A of Table 2.3. The Expanded Model incorporates the variables in Model 3, Panel A of Table 2.3. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

In terms of the MDA, panel B in Table 2.6 reports the estimates resulting from our expanded model (which involves the variables in Model 3 of Table 2.3) in addition to the base model (which involves the variables in Model 1 of Table 2.3). The Wilks' lambda statistic of the expanded model (0.767) implies that the model has a high significance in discriminating between the failed and the healthy firms at the 1% significance level. Besides, the reduction in the unexplained proportion of the groups' total variability from 0.772, as is indicated for the base model, to 0.767, as is indicated for the expanded model, implies that *CF-Disclosure* contributes to the discriminating model. These results, in sum, accord with the previous findings derived from the logit analysis.

Fifth, as we noted earlier, Gandhi et al. (2019) in a contemporaneous paper, using an approach different from ours, show a significant association between the negative sentiment category proposed by Loughran and McDonald (2011), as a proxy for financial distress, and a US bank's omission of dividends and experience of lower return on assets (ROA) in the following year. Similarly, we check *CF-Disclosure* ability to predict dividend omission and ROA decrease in the subsequent year. In Model 1 and Model 2 of Table 2.7, the significantly positive (negative)

than its counterpart (0.995) for Altman's (1968) original Z-score model, that contains five popular financial ratios, tested in the UK context (for more details see Almamy et al., 2016).

coefficient on *CF-Disclosure* with a Z(T)-statistic of 3.674 (-2.827) at the 1% significance level suggests that *CF-Disclosure* is significantly predictive of a following year dividends omission and lower ROA due to a firm's financial distress. In unreported tests to predict dividend omission and ROA using the negative sentiment category of Loughran and McDonald (2011), our sample fails to find significant result for ROA. A plausible reason for this insignificant result is that the negative category of Loughran and McDonald (2011) does not recognize CF-related reorganization tone, which we find negatively significant with ROA with a T-statistic of -2.585 at the 5% level.

Table 2.7.
Logit and fixed effects panel regressions using alternative proxies

VARIABLES	Model 1	Model 2	Model 3	Model 4
	$Dividend\_Omission_{it+1}$	ROA_{it+1}	CF_{it+1}	CF_{it+1}
CF-Disclosure	0.703***	-5.199***		
	(3.674)	(-2.827)		
Negative_Tone			2.337***	
			(7.915)	
Warning_Tone				1.914***
				(8.046)
Constant	-1.624	5.566	-9.324***	-9.901***
	(-1.221)	(0.495)	(-5.202)	(-5.547)
'*Base & CG controls*'	Included	Included	Included	Included
Observations	3,941	3,708	3,941	3,941
Pseudo (R^2)	0.313	(0.293)	0.203	0.207

This table reports the results from logit (Models 1, 3, and 4) and fixed effects (Model 2) panel estimations. In Models 1 and 2 we replace our *CF* indicator with *Dividend_Omission* and *ROA* as financial distress indicators, respectively. In Models 3 and 4 we replace the *CF-Disclosure* with the negative sentiment category proposed by Loughran and McDonald (2011) and our warning category, respectively. *Dividend_Omission* is a dummy variable that equals one if the firm does not pay dividends in the subsequent year, and zero otherwise. *ROA* is the subsequent year return on assets = net income/total assets. *Negative_Tone* is the percentage of negative words in the annual report narratives captured using Loughran and McDonald's (2011) negative wordlist (http://www3.nd.edu/~mcdonald/Word_Lists.html). *Warning_Tone* represents a CF-Disclosure subgroup that reveals management warning signals captured by the percentage of warning words in the annual report narratives. '*Base & CG controls*' indicates the inclusion of accounting, market, macroeconomic, and corporate governance control variables shown in Model 4, Panel A of Table 2.3. Robust standard errors are adjusted for clustering at the firm level. Z(T)-statistics are in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

In Model 3 and Model 4 of Table 2.7, we replace the aggregate score of *CF-Disclosure* with Loughran and McDonald's (2011) negative category (which contains 2,355 words) and our warning category to predict CF (which contains 196 words). As expected, the overall pessimistic sentiment in the annual report narratives is significantly related to higher probability of subsequent CF (under Model 3, *Negative_Tone* is significantly positive with a Z-statistic of 7.915 at the 1% level). Model 4

reveals a relatively higher predictive ability of our CF-related warning category (*Warning_Tone* is significantly positive with a Z-statistic of 8.046 at the 1% level). Additionally, the marginally higher Pseudo R^2 higher (0.207 > 0.203) illustrates the accuracy of our CF wordlist in capturing the warning messages conveyed in annual report narratives about the CF likelihood. Overall, results suggest that our CF wordlist is well-established for the CF context, and importantly complementary to Loughran and McDonald's (2011) negative wordlist to identify words most related to CF in the overall negative sentiment narratives.

Table 2.8.
Multinomial logit regression of financial distress (FD) and bankruptcy (BR) on CF-Disclosure

VARIABLES	One year prior to *FD/BR*		Two years prior to *FD/BR*	
	Model 1	Model 2	Model 3	Model 4
	FD	*BR*	*FD*	*BR*
CF-Disclosure	1.865***	0.985***	1.649***	0.683***
	(5.707)	(4.630)	(4.388)	(2.972)
Constant	-2.071	-14.719***	-6.222*	-16.325***
	(-0.812)	(-6.274)	(-1.941)	(-7.753)
'*Base & CG controls*'	Included		Included	
Observations	3,941		3,441	
Pseudo R^2	0.205		0.186	

This table reports the results from multinomial logit financial distress/bankruptcy prediction models. Thus, it shows the link between the CF-Disclosure variable and the probability of CF while financial distress and bankruptcy risks are recognized separately. Financial distress (FD) is defined as whenever a firm simultaneously experiences, for two consecutive years, the following conditions: first, negative growth in the market value; second, its financial expenses surpass its earnings before interest, taxes, depreciation, and amortization. Bankruptcy (BR) is defined as when a firm's status is under administrative receivership, administration, company voluntary arrangement, voluntary liquidation, liquidation or when there is a cancellation of the firm and it is assumed valueless. *'Base & CG controls'* indicates the inclusion of accounting, market, macroeconomic, and corporate governance control variables shown in Model 4, Panel A of Table 2.3. Robust standard errors are adjusted for clustering at the firm level. Z-statistics are in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Refer to Table 2.1 and Appendix 2.D for the variable descriptions, measures, and sources.

Sixth, we use a multinomial logit model (which is often referred to as conditional logit model) to clarify the predictive power of *CF-Disclosure* to capture the probability of CF while recognizing financial distress (*FD*) and bankruptcy (*BR*) risks separately. For both tests in a year and two years prior to *CF*, Table 2.8 indicates that *CF-Disclosure* retains its high significance (at the 1% level) in predicting the probability of *FD* (Z-statistics are 5.707 and 4.388, respectively) and *BR* (Z-statistics are 4.630 and 2.972, respectively). Collectively, the qualitatively immutable and systematic inferences provided by Table 2.8 are consistent with our previous results. This also demonstrates

the power and practicality of the CF definition that includes the financial distress and bankruptcy risks (Campbell et al., 2008; Tinoco and Wilson 2013).

Furthermore, above, we use a multinomial logit model because the categories of our dependent variable convey no natural ordering. In unreported tests, however, we *assume* that our dependent variable conveys ordinal categories (bankruptcy, financial distress, or healthy) hypothetically like that, for instance, of a firm's credit ratings (*say*: in default, speculative, or investment) (e.g., Ashbaugh-Skaife et al., 2006). Accordingly, we estimate an ordered logit model investigating the ability of *CF-Disclosure* to predict the probability of failure in such a setting. The untabulated results (Z-statistics are 6.856 and 4.747 at the 1% level for tests in one year and two years prior to *CF*, respectively) are collectively consistent with those previously drawn from our prior analyses. Besides, we rerun all models presented in Table 2.3 using two sub-samples in which we consider financial distress and bankruptcy separately. All unreported results are robust and consistent with that derived from the previous analyses (*CF-Disclosure* is significant at the 1% level in predicting the probability of either *FD* or *BR*). As a final robustness check, controlling for unobserved heterogeneity, the unreported results of our principal analyses with year and industry fixed effects collectively and generally are consistent. Overall, our sensitivity tests illustrate that our inferences are robust to using alternative measures and estimation procedures.[23]

2.7. Conclusion

This chapter contributes to the literature on CF prediction by examining the predictive ability of narrative-related disclosures. To gauge narrative-related disclosures, we established a comprehensive list of CF-related keywords capturing the CF sentiment in annual report narratives. Regarding CF-Disclosure and CF prediction, we find that greater incidence of CF-Disclosure in

[23] Predicting CF for one year and/or two years before the event of failure is common in literature because data availability for failed companies is limited; most typically have three firm-year observations prior to CF (e.g., Darrat et al., 2016). Interestingly, our untabulated results from a limited sample show that CF-Disclosure can predict CF up to six years in advance, which accords with the trend presented in Appendix C for the Carillion case. Although this predictive ability is consistent with the forward-looking pattern of narrative disclosures, it should be viewed with caution as it is likely to be linked to firms that have a higher ability to exist longer.

the annual reports is strongly associated with a higher likelihood of CF, in both the year immediately prior to failure and the penultimate year. Our study also provides evidence suggesting that CF-Disclosure offers an incremental predictive ability relative to accounting, market and macroeconomic variables that are widely used in the classical CF prediction models. Thus, CF-Disclosure is feasible in enhancing the explanatory power of the models that predict CF. Additionally, we observe that a financially distressed firm becomes more vulnerable when financial constraints occur, which thereby would accelerate the CF incident. Various robustness tests verify the credibility of the incremental explanatory power of CF-Disclosure for CF prediction.

Despite the importance of our results, they should be interpreted taking into consideration the following limitations. First, despite the rational premise of our legal and financial definition of CF, it could be a consequence of various reasons such as an ethical problem of management, like committing fraud (Hsu and Wu, 2014). Second, annual reports are used because they represent a key source of information for investors. However, other outlets of corporate communication (e.g., financial analysts' reports, conference calls and/or online resources) could contain unique signals of the likelihood of failure. Third, our chapter adopts a quantity-based methodology in measuring CF-Disclosure, without gauging the quality. These limitations might provide avenues for future research on CF.

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Appendices of Chapter 2

Appendix 2.A. Summary of empirical work, presented in chronological order, on the relation between qualitative information and firm's status				
Panel A: Accounting and finance domain				
Study name (year)	Journal	Jurisdiction	Sample	Approach
Tennyson et al. (1990)	JBFA	USA	46 firms during 1978-1980.	Using automated textual analysis for the 10-Ks' president's letters and the management analysis, authors identify different themes (e.g., internal operations, growth and expansion) and link them to bankrupt and non-bankrupt firms.
Kaplan and Zingales (1997)	QJE	USA	49 low-dividend paying firms during 1970-1984.	Using automated textual analysis for the 10-Ks' the Liquidity and Capitalization Resource Subsection (CAP+LIQ) in the Management Discussion and Analysis (MD&A) section, authors use the firms' qualitative information to classify each firm-year into one of five categories based on its financial constraint status in order to investigate whether firm's financial (health or constraints) status interrupts the association between the firm's investment and cash flow.
Smith and Taffler (2000)	AAAJ	UK	66 manufacturing and construction firms during 1978-1985.	Using automated textual analysis for the chairman's discretionary statement, authors employ form oriented and meaning oriented means of analysis to explain corporate failure. Notably, authors call future research to examine the incremental explanatory ability of the discretionary narrative disclosure to that obtained by financial variables alone. They also invite future research to examine beyond the chairman's statement because narrative-related disclosure was a very recent innovation in UK reporting practice of the time of the study.
Boo and Simnett (2002)	ABACUS	Australia	140 non-financial firms during 1990-1991.	Using manual textual analysis for content of management's prospective comments in financially distressed companies, authors categorize management's comments into optimistic, pessimistic, mixed or silent and find that management's prospective comments are useful to predict firms' future viability.
Uang et al. (2006)	EFM	UK	179 non-financial firms during 1994-2000.	Using automated textual analysis for the tone of the going concern statements by management and auditor, authors examine whether auditor and management going concern narratives signal the severity of subsequent outcomes appropriately. They find the tone of the auditor does, while that of the management does not.
Holder-Webb and Cohen (2007)	JBE	USA	136 non-financial firms during 1990-1995.	Using a proprietary index based on SEC reporting requirements and practitioner guidelines, authors measure the quality of MD&A disclosures for a sample of firms entering financial distress in an effort to determine whether changes in the disclosure appear to be motivated primarily by economic or ethical concerns.
Hadlock and Pierce (2010)	RFS	USA	1,848 non-financial firm-year observations during 1995–2004.	Using manual textual analysis for the 10-Ks, authors use qualitative data as a means to categorize a firm's financial constraints. Then, the qualitative categories are incorporated with some proper financial ratios. Using this qualitatively determined financial constraint status, authors employ ordered logit models predicting constraints as a function of different quantitative explanatory variables.

Hoberg and Maksimovic (2015)	RFS	USA	52,438 non-financial firm-year observations during 1997–2009.	Using automated textual analysis for the 10-Ks' CAP+LIQ in the MD&A section, authors acquire continuous measures of financial constraints to investigate the association between the different external finance constraints and firms' characteristics, besides studying the link between these constraints and investment and issuance policies following unexpected negative shocks.
Bodnaruk et al. (2015)	JFQA	USA	51,533 non-financial firm-year observations during 1997–2011.	Using automated textual analysis for the 10-Ks, authors use qualitative information to first create financial constraints wordlist, then use their wordlist to construct a measure of financial constraints as the percentage of constraining words in 10-K narratives. Finally, they use that measure to directly predict financial constraints events (dividend omissions, dividend increases, equity recycling, and underfunded pension plans).
Mayew et al. (2015)	AR	USA	45,725 firm-year observations during 1995–2012.	Using the mandatory going concern opinion by the management under FASB's requirements, as well as the overall linguistic tone of the MD&A utilizing LM (2011) negative and positive wordlists, authors measure a firm's ability to continue as a going concern.
Gandhi et al. (2019)	JBF	USA	6,223 bank-year observations during 1997-2014.	Using LM (2011) negative wordlist, authors examine the link between the proportion of negative words in the US banks' 10-Ks and four separate variables of financial distress (subsequent distressed delisting, dividends omission, loan losses, and ROA) to introduce negative sentiment in banks' 10-K narratives as a new proxy for bank distress.
Muñoz-Izquierdo et al. (2019)	JBR	Spain	808 non-financial firm-year observations during 2004–2014.	Using manual textual analysis for comments disclosed in auditor's unqualified opinions, unqualified opinions with emphasis paragraphs, and qualified opinions, authors indicate that auditor's report can reveal the causes of business failure, where 11 causes are studied.
Panel B: Machin learning domain*				
Study name (year)	Journal	Jurisdiction	Sample	Approach
Cecchini et al. (2010)	DSS	USA	156 manufacturing firms during 1994-1999.	Using a complex vector space model, authors analyze the textual content in MD&A disclosures to predict bankruptcy and fraud outcomes. To predict bankruptcy, the algorithm they use incorporates word sense disambiguation that considers the context of a sentence and employs the WordNet program to create a concept score to identify classifiers of bankrupt and non-bankrupt firms. Later, a Support Vector Machine classification method is used to identify phrases that ultimately discriminate between bankrupt and non-bankrupt firms.
Shirata et al. (2011)	JETA	Japan	180 firms during 1999-2005.	Using text mining methods (morphological analysis and conditional probability), authors analyze the sentences in annual reports and extract key phrases/descriptions, where they show that a distinguishing between bankrupt firms and non-bankrupt firms can be done using some particular expressions when appear together with the word "dividend" or "retained earnings".
Yang et al. (2018)	JETA	USA	168 firms from 2014.	Using SAS Text Miner and a latent semantic analysis algorithm, authors extract high-frequency words, related concept links, and topics from MD&As to identify differences in textual expressions used by bankrupt and non-bankrupt firms. They only observe that some high-frequency words appear to suggest differences between bankrupt and non-bankrupt firms regarding their financial position and ongoing status.

Mai et al. (2019)	EJOR	USA	94,994 firm-year observations during 1994–2014.	Designing a deep learning approach, i.e., a machine learning paradigm that combines multiple layers of neural networks to learn representations of data with multiple levels of abstraction, authors employ different model set-ups using varying input data (based on an end-to- end machine-learning model, in which the learning algorithm goes directly from the raw textual input to the prediction) and find that MD&A information content is useful for bankruptcy prediction. They also suggest that a simple deep learning model using an average of the embedding layer is better than other data mining models when textual information is used.
Tang et al. (2020)	JF	China	424 firms during 2014-2018.	Extracting valuable features by using the wrapper-based method, followed by constructing multiple single classifiers, ensemble classifiers, and deep learning models, authors propose a framework (incorporating the integration of financial, management, and textual factors) to reveal the financial distress features of listed Chinese firms. Their experiment results (which indicate the superiority of ensemble classifiers and deep learning models) suggest that management and textual factors are the key factors in the financial distress prediction of listed Chinese companies.
Appendix A gives a summary of recent research on the relation between narratives and CF. * There are various methods for modeling using machine learning methods, with several purported advantages (e.g., improved predictive performance). However, machine learning methods are "black boxes" preventing from understanding the role of each independent variable and thus, making results interpretation a big problem. Additionally, many of these methods are complex (and potentially add more noise than signal) and have many important drawbacks. Refer, for example, to Loughran and McDonald (2016) and Jayasekera (2018) for more detailed discussion.				

Appendix 2.B.
The final wordlist of corporate failure

Reorganization

Opportunity Opportunities Revised Strategy Strategic Strategies Restructuring Restructure Restructured Resolution Resolutions Comply Complying Compliance Complied Complies Agreement Agreements Agreed Agreeing Administrator Administration Contractual Join Joined Appoint Appointed Appointment Appointing Renegotiate Renegotiated Negotiations Negotiating Negotiate Negotiated Diversify Diversified Facilities Facility Reorganization Reorganized Refinancing

Warning

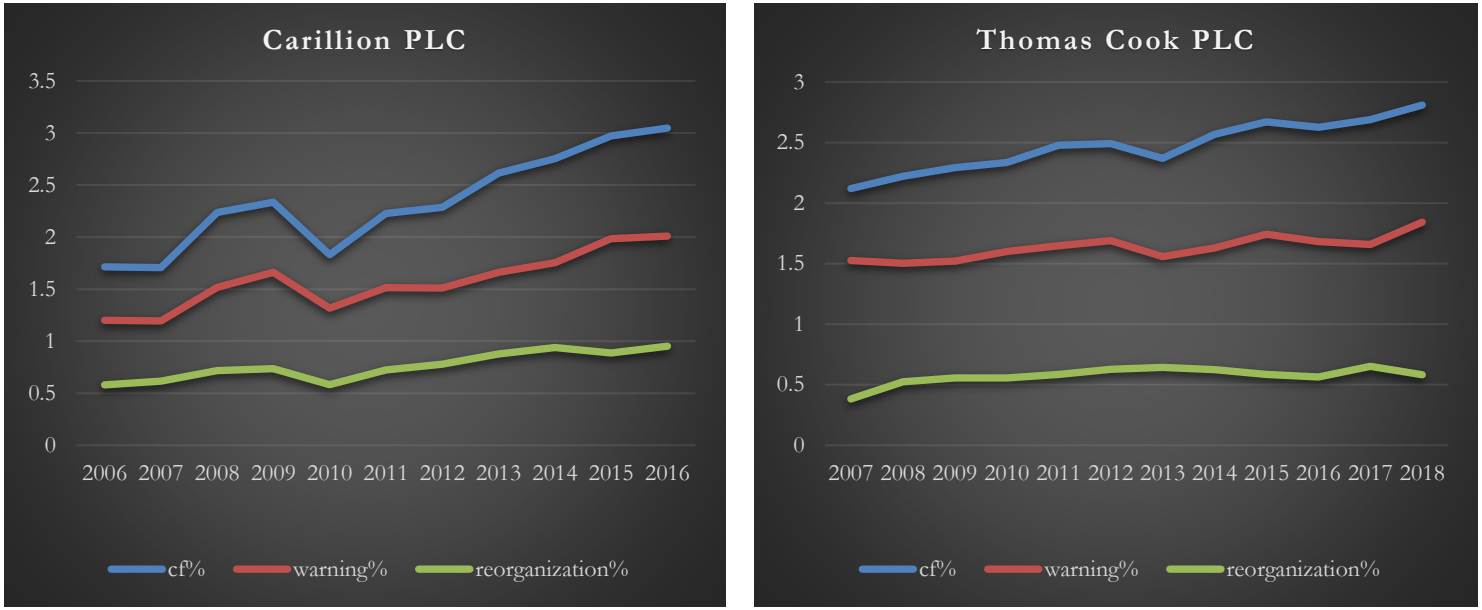
Require Requires Requiring Required Requirement Requirements Competition Competitive Competitors Reduce Reducing Reductions Reduced Reduction Delist Delisted Delisting Incurred Incur Mitigate Mitigated Mitigation Reversed Reverse Fell Fallen Fall Falls Falling Exposure Exposures Exposed Problems Non-compliance Misstatements Misstatement Limitations Limits Limited Insufficient Suspension Suspend Suspended Suspensive Court Courts Delay Delays Obligation Obligations Legal Termination Retired Left Resigned Resignation Resignations Contract Contracts Contracted Restricted Restrictions Liquidation Liquidating Liquidated Liquidator Litigation Divestment Dependent Depend Depends Depending Critical Difficult Difficulties Unexpected Need Needs Needed Slower Slowly Slow Instability Suffered Hindered Downturn Cancel Cancelled Cancellation Obstacles Low Lower Lowest Discontinued Uncertain Uncertainty Uncertainties Pressure Pressures Forced Concern Concerning Tough Bankruptcy Commitment Commitments Committed Defer Doubtful Doubt Unable Inability Negatively Negative Dispute Disputed Drop Sever Severely Severe Imposed Adverse Adversely Challenging Challenges Challenge Unpaid Decline Declined Declining Lack Lacked Threat Constraints Constrain Constraint Tight Illiquid Illiquidity Volatile Volatility Depressed Hazards Hazardous Legislation Conflict Conflicted Conflicts Penalties Injunctions Damages Damaging Damage Damaged Revocation Turmoil Against Unfortunately Decrease Decreased Less Drawn down Draw-down Step down Stepped down Losing Loses Loss Losses Lose Lost Risk Risks Riskier Riskiest Risky Riskiness Fail Failed Failing Failings Fails Failure Failures Fragile Poorly Poor Recession Impairment Impairments Impaired Necessary Disappointing Complaints Default Closed Covenant Covenants

Statistical

Changes Change Potentially Potential Significance Significant Significantly Anticipate Anticipated Likelihood Likely Material Materially Differ Differed Differing Differs Conditional Fluctuation Fluctuations Affect Affected Affecting Susceptible Believed Believe Viable

This list presents CF-related keywords used to capture the CF sentiment in annual report narratives. The total sum of words is 267. Words are classified according to their connotations.

Appendix 2.C.
Validity examination of CF wordlist on the cases of Carillion PLC and Thomas Cook PLC
Figure 2.2



This figure gives the timeline of CF sentiment in annual report narratives of two sudden high-profile corporate collapses in the UK. Carillion PLC went into liquidation on 15 January 2018 (*it is officially the largest ever trading liquidation in the UK*; www.gov.uk/). Thomas Cook PLC (the world's most iconic travel brand) went into liquidation on 23 September 2019. Data based on the last available annual reports. The percentage of words are scaled by the total number of words in the annual report.

Appendix 2.D.
Variable descriptions, measures, sources, and examples of prior literature

	Sort	Variable	Definition and measurement	Source	Ex. sign	Examples of relevant literature
	Dependent	Corporate Failure	Binary outcome variable, one = event of financial distress or bankruptcy; zero = otherwise.	Coded	(N/A)	Tinoco and Wilson (2013)
Control variables (and represent the base model)	Accounting	*ROA*	Return on Assets is a measure for firm profitability = net income/total assets.	Worldscope	(-)	Campbell et al. (2008)
		Current Ratio	It is a measure of firm liquidity = current assets/current liabilities.	Worldscope	(-)	Chava and Jarrow (2004)
		Capital Structure	Measured by firm leverage = total debt/total equity.	Worldscope	(+)	Darrat et al. (2016)
		Funds from Operation	It is a measure of firm performance = total funds from operations/total liabilities.	Worldscope	(-)	Almamy et al. (2016)
	Market	*PRICE*	Measured as the log of firm's equity price.	Datastream	(-)	Tinoco and Wilson (2013)
		Abnormal Returns	It is the firm's cumulative monthly abnormal returns on an annual basis = the firm's cumulative annual returns minus the FTSE All Share return index for the same period of time.	Datastream	(-)	Tinoco and Wilson (2013)
		Market Cap	Measures the firm's relative value as log the firm's market capitalization relative to the total market capitalization of the FTSE All Share index	Worldscope	(-)	Mayew et al. (2015)
		Volatility	Sigma of market returns is used as a measure of total risk, which is in turn measured by the standard deviation.	Datastream	(+)	Mayew et al. (2015)
		MB	Represents market to book ratio = Market value equity/book value equity.	Datastream	(+)	Campbell et al. (2008)
	Macroeconomic	*RPI*	Represents the Retail Price Index (RPI) in base 100 as a measure of inflation rate.	Datastream	(+)	Tinoco and Wilson (2013)
		TBR	Represents the 3-Treasury Bill Rate (TBR) as a proxy for interest rates.	Datastream	(+)	Tinoco and Wilson (2013)
Corporate governance control variables	Corporate Governance	*Board Size*	Measured by the log of the total number of board of directors.	BoardEx	(-)	Platt and Platt (2012)
		Board Independence	Measured by the proportion of independent non-executive directors to the board size.	BoardEx	(-)	Daily and Dalton (1994)
		CEO Turnover	It is a dichotomous variable coded as one if the firm experienced a change in CEO and zero otherwise.	BoardEx	(+)	Daily & Dalton (1995)
		Gender Diversity	Measured by the proportion of female directors on the board of directors.	BoardEx	(-)	Darrat et al. (2016)
		Duality Role	It is a dummy variable set to one if the CEO is also chairman of the board of directors or executive chairman presents on the board and zero otherwise.	BoardEx	(+)	Daily and Dalton (1994)
Narrative-related disclosures	Corporate failure related narrative disclosures	*CF-Disclosure*	It reflects the aggregate information regarding corporate failure that can be found in the narrative sections of annual reports. This typically relates to the discussion sections, which exclude the financial statements but include the notes to the accounts. The scores are generated based on textual analysis using Diction version 7 to count the number of words that exists in the final CF-related narratives wordlist. The score is calculated by the percentage of words	Annual Reports via Thomson one/Bloomberg using Diction 7	(+)	Hypothesized (as discussed in Section 2.4.)

indicating the likelihood of corporate failure in the narrative sections of annual reports.

Chapter 3. Is expanded auditor reporting meaningful? UK evidence

3.1. Introduction

In June 2013, the revised ISA 700 (UK and Ireland) (FRC 2013a) mandated the independent auditor of companies with a premium listing of equity shares on the London Stock Exchange (LSE) Main Market with fiscal year-ends on or after September 30, 2013 to disclose risks of material misstatement (for simplicity, auditor risk disclosure, ARD henceforth) with the greatest effect on the audit, the application of materiality, and the scope of the audit.[24] Consistent with the main objective of ISA 700 of enhancing the informativeness of the auditor report (e.g., FRC 2012; FRC 2013b; ACCA 2013), the switch from the boilerplate pass/fail model to the expanded audit report is thought to be useful for the users of financial statements.[25] So far, archival studies seeking to relate the enhanced disclosure of the expanded auditor reporting in the UK to measurable economic benefits for the capital market have, however, produced insignificant or mixed results (e.g., Lennox et al., 2019; Gutierrez et al., 2018; Reid et al., 2015). Therefore, this chapter explores: 1- whether the expanded auditor's report is not generic (i.e., exhibits information specific to the audited company) and thus, the new audit report regime may yield benefits to complying firms through lower information risk that translates into lower cost of equity, and 2- whether the reporting regulation change and information content of the expanded audit report affect information asymmetry and risk perceptions.[26]

[24] Auditor exercise of professional judgment on materiality is mainly related to the assessed and identified ARD. In this relationship, a higher (lower) level of current or expected risks of material misstatement provides a basis for the auditor to set a lower (higher) materiality threshold and vice versa (FRC 2009). Thus, throughout the chapter, ARD discussion is also related to materiality.

[25] A similar new auditor report model is also required by the International Auditing and Assurance Standard Board (IAASB) and Public Company Accounting Oversight Board (PCAOB), where it is compulsory for the auditor to communicate the key or critical audit matters (IAASB 2015; PCAOB 2017). Among the three standards issued by FRC, IAASB, and PCAOB, ARD is common, whilst materiality and scope disclosures are not required for IAASB and PCAOB compliers. For this reason, like Lennox et al. (2019), we focus our discussion and content analysis on ARD. Our additional analysis, however, concerns auditor disclosed materiality.

[26] According to PCAOB (2016), expanded auditor's disclosure that does not exhibit information specific to the audited company, avoiding standardized language, is less likely to impact information asymmetry. Therefore, it is important to initially document that there is a relationship between the expanded disclosure and the information risk specific to the audited company to evidence that the expanded disclosure is not generic.

In the beginning, we explore the relation between ARD (i.e., the revealed risks of material misstatement or key/critical audit matters) and idiosyncratic and systematic risk, and the cost of capital. In this exploration, we posit that higher ARD is associated with a firm's less reliable financial reporting, and hence information risk borne by investors, resulting in a higher cost of capital (Ashbaugh-Skaife et al., 2009; Kothari et al., 2009).[27] Therefore, consistent with the theoretical work in Lambert et al. (2007) and empirical tests of Ashbaugh-Skaife et al. (2009) and Kotheri et al. (2009), we conduct cross-sectional tests (mitigating endogeneity concerns related to correlated omitted covariates) to examine whether firms with higher ARD present higher systematic risk (beta), higher idiosyncratic risk, and higher cost of capital. Following prior research (e.g., Ashbaugh-Skaife et al., 2009), we postulate that ARD first disclosed in 2013-expanded audit reports existed for some time before auditor disclosure. Additionally, we postulate that the market is able to form expectations about the disclosed risks based on observable firm characteristics, and that these expectations are incorporated in the information risk measures mentioned above.

If our conjecture is true, and as the first public revelation of risks of material misstatement credibly affirms the relative level of financial reporting reliability,[28] so the new reporting rule may yield benefits to the complying firms (that have relatively low risks of material misstatement, i.e., more reliable financial reporting) through a lower information risk and a lower cost of capital. Importantly, this suggests that the expanded auditor's disclosures are not generic, but meaningfully and credibly capture the information risk that a firm presents to investors. This also leads us to expect consequences of the reporting regulation change and information content of the expanded

[27] In the expanded audit report, auditors in the UK become able to describe key/critical audit matters or risks such as the effectiveness of internal controls. In the US, Ashbaugh-Skaife et al. (2009) expect and find that firms that disclose internal control deficiencies (an indicator of less reliable financial reporting) show higher systematic risk, higher idiosyncratic risk, and higher cost of equity.

[28] Information is typically provided by managers and/or information intermediaries such as financial analysts and press releases. These sources of information, however, are either informal or lack the credibility required to assure information reliability. The capital market, therefore, is likely to consider the expanded disclosures conveyed by the independent auditor due to the credibility and formal form that they entail. The effects of such disclosures ultimately are expected to be manifested in the firm's beta, higher idiosyncratic risk, and cost of capital (see Kothari et al. (2009) and Ashbaugh-Skaife et al. (2009) for more details).

audit report on information asymmetry and risk perceptions when this credible information becomes publicly available, which drives to explore the second research question as follows.

One explanation for the recent academic failure to find any benefits or finding mixed evidence around this audit report regime change or the content of the expanded auditor's report is that the few prior archival studies employ short-window analysis for investors' reaction (e.g., Lennox et al., 2019; Gutierrez et al., 2018; Reid et al., 2015).[29] Given the greater amount of information contained in the expanded auditor's report, we expect that investors cannot promptly interpret it and update their judgments (Miller, 2010; You and Zhang, 2009). Another explanation is that expanded auditor's disclosure is generic and thus, is not informative to the market participants.[30] Therefore, in answering the second research question, we adopt an examination period of six months (e.g., Leuz and Verrecchia, 2000; Elsahndidy and Shrives, 2016; Lennox et al., 2019). This is long enough to permit investors and analysts to assess expanded auditor's disclosure and so to investigate the effects on their real investment and forecast decisions, but short enough to limit the influence of confounding events, such as the disclosure of other information about corporate risk. Consequently, if the new audit report regime is useful to the firm's capital market and/or the increased content of the expanded audit report (focusing on ARD and the materiality level) is informative, we expect an impact on the firm's capital market environment, proxied by the return volatility, and analyst forecast dispersion as surrogates of users' perceptions of firm risk (e.g., Kothari et al., 2009), as well as bid-ask spread and trading volume as surrogates for firm market liquidity (e.g., Leuz and Verrecchia, 2000).

[29] Testing long-window abnormal stock performance (a span up to six months), employing buy-and-hold abnormal returns (BHARs), Lennox et al. (2019) find no significant effect of expanded auditor's disclosure. We, however, do not think that is definitive because using BHARs for statistical inferences in its traditional form is criticized for serious issues (e.g., Mitchell and Stafford, 2000; Bessembinder and Zhang, 2013; Dutta et al., 2018).

[30] Responding to FRC Revision to ISA (UK and Ireland) 700, KPMG (2013) demonstrates that expanded auditor's disclosure may well be of benefit to shareholders depending on, among others, "the time they are able to spend analyzing the information." Archival studies (Lennox et al. 2019; Gutierrez et al., 2018) on the expanded audit report suggest potential reasons for their insignificant results about market reaction including market inability to understand the implications of the disclosed risks, which supports our postulation that market needs a longer period to interpret it and update their judgments. Furthermore, our cross-sectional tests are employed to investigate that the expanded disclosure is not generic.

Exploiting the exogenous shock of the FRC's regulatory change of the auditor report in the UK to control for simultaneity and self-selection-based endogeneity concern (Carcello and Li, 2013; Leuz and Wysocki, 2016), we archivally investigate the economic usefulness of audit report regime change. We employ pre- to post-regulatory period analysis (i.e., two years before and two years after the expanded audit report adoption) for complying companies (i.e., companies with premium listing). This design, therefore, focuses on compilers with the regulation to test the overall influence of expanded auditor's disclosure on decision usefulness linked to a firm's capital market environment. Using this time-series difference design, where each company works as its own control, enables a powerful examination of variations related to complying companies, and control for endogeneity bias resulting from firm-level correlated omitted characteristics (Doyle and Magilke, 2013).[31] In this investigation, we have two competing expectations. Literature on general disclosure drives us to expect that under the new reporting regime, the companies adopting the regulation benefit from lower information asymmetry and risk perceptions (e.g., Leuz and Verrecchia, 2000). Conversely, prior risk disclosure literature suggests an increase in the perceived risk (e.g., Kravet and Muslu, 2013; Campbell et al., 2014; Elshandidy and Shrives, 2016).[32]

For exploring the informativeness of the ARD content, following Lennox et al. (2019), we employ the number of risks disclosed in the audit report, as well as an automated textual analysis utilizing Elshandidy and Shrives' (2016) risk wordlist to inspect the information content of risk-related disclosure. We run post-regulatory period analysis on the premium listed companies (i.e., the expanded audit report adopters) in the two years after the new reporting regulation. We expect

[31] ISA (700) was released in June 2013, only four months before becoming effective. Thus, both complying companies and the capital market had little chance to pre-empt FRC's regulatory changes, which implies that our staggered design works well because the economic outcome variables are not anticipatory in nature (see Leuz and Wysocki, 2016).

[32] More details are provided in Section 3.4. and as the chapter proceeds. Notably, prior studies show that employing companies listed on UK AIM (which are not required to comply with the expanded audit report) or other country companies (e.g., US) as a control group is not an appropriate empirical practice in this setting for the following reasons. AIM companies are not reasonable counterfactuals since they typically are smaller, growing, and likely have a different information environment than premium-listed companies (e.g., Gutierrez et al., 2018). Using other country companies is risky because of important differences in culture, law, institutions, and regulatory regimes. These differences can lead to the *ceteris paribus* fallacy, the potential for significant omitted country-specific variables, and limit the generality of the findings (Reid et al., 2019). Thus, using staggered adoption of the new auditor reporting rule to create a control sample is the appropriate empirical practice.

to find impact of ARD on information asymmetry and risk perceptions among market participants if they do not see it as boilerplate.

Consistent with our predictions, our cross-sectional examinations indicate that firms receiving an expanded audit report with a higher level of risk disclosure exhibit significantly higher beta and cost of equity. In addition, we find significantly negative associations between auditor disclosed materiality (which is negatively related to the assessed and identified risks of material misstatement) and idiosyncratic risk, beta, and cost of equity. These findings suggest that expanded auditor's disclosure is meaningfully associated with the information risk that a firm presents to investors. That is, the expanded auditor's report is not generic. Thus, firms complying with the new reporting rule, which have relatively more reliable financial reporting, i.e., have relatively low risks of material misstatement inducing the auditor to specify a high level of materiality, can benefit from a lower information risk and a lower cost of capital.

As to the intertemporal tests of the economic usefulness of audit report regime change, and the information content of auditor disclosures, the evidence we find suggests that the new reporting regime is, on average, related to higher market liquidity (trading volume) and investors' perceived risk (volatility of market returns). More specifically, the intertemporal results on the informativeness of the expanded audit disclosures indicate that the high level of ARD positively and significantly impacts the trading volume, volatility of market returns, and analyst forecast dispersion. Consistent with the assumption that auditor determined materiality is negatively related to audit effort (Livne et al., 2018), our intertemporal results further indicate that market participants appreciate the firm with a lower level of disclosed materiality due to the higher credibility it indicates about the audited outputs. Specifically, we find a significantly positive (negative) impact of the determined materiality threshold (i.e., low audit effort) on bid-ask spread, (trading volume), and analyst forecast dispersion.

Overall, our cross-sectional and intertemporal analysis results document that the expanded auditor reporting is firm-specific and useful for financial statement users. The evidence we provide

is also consistent with the view of FRC (followed by others such as IAASB and PCAOB as shown later) that the expanded auditor's report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants.

Our study provides several contributions to the growing literature on the informativeness and economic consequences of the expanded audit report, which is a focus of attention in the UK, the US and many other jurisdictions, as follows. First, exploiting the real context of the expanded audit reports, we augment the evidence derived from the experimental studies (discussed later) by employing archival research methods on actual firm and market behavior. Second, we complement the archival studies on the effect of the expanded auditor's report regime and information content on the investors' reaction by examining the impacts on the firm's market liquidity and users' risk perceptions. Third, our results offer some explanation for the mixed evidence on the benefits of the changes to the audit report. Fourth, in examining the economic consequences for: 1- firms that have switched to the new audit reporting standard, and 2- the information content of the expanded audit report, we provide comprehensive evidence and thus, contribute to the global concern from standard-setters, regulators and capital market participants.[33] Finally, findings related to auditor disclosure on the determined materiality speak directly to the concerned parties (e.g., IAASB and PCAOB) about its importance as a component of the expanded audit disclosures. The findings also suggest that future research should not confine its attention only to the number of risks disclosed by the auditor but should consider the content of risk disclosure as well.

The remainder of this chapter proceeds as follows. Section 3.2. represents the expanded auditor reporting background. Section 3.3. discusses the theoretical considerations. Section 3.4. reviews relevant prior literature and develops the research hypothesis. Section 3.5. explains research design. Section 3.6. discusses the empirical results, additional analyses and robustness checks. Section 3.7. concludes.

[33] Recently, the inconclusive evidence on the usefulness of the expanded audit report raises PCAOB's concern (PCAOB 2017). Also, FRC (2016) indicates an interest in reviewing both the volume and the content of ARD.

3.2. Background

In order to provide more meaningful information content beyond the traditional standardized pass/fail audit opinion on the financial statements, standard-setters and regulators all over the world adopt the expanded audit report. Taking the initiative in 2013, FRC in the UK issued the revised ISA (UK and Ireland) 700 requiring auditors of companies with a premium listing of equity shares on the LSE Main Market with fiscal year commencing on or after October 1, 2012 to report on: 1- the risks of material misstatement which had the greatest effect on the audit's strategy, allocation of resources and engagement team efforts; 2- how the concept of materiality is applied in planning and performing the audit; and 3- the scope of the audit in relation to how the risks of material misstatement are addressed and the influence of materiality (FRC 2013a). The form and content of the auditor's report have also undergone changes outside of the UK. The IAASB, the European Union (EU) and the PCAOB have all adopted requirements that expanded the auditor's report.

The IAASB's ISA 701 became effective for audits of listed entities for periods ending on or after December 15, 2016 in many jurisdictions all over the world, where auditors are responsible to communicate the key audit matters (KAMs) in their reports (IAASB 2015).[34] Similarly, PCAOB's Auditing Standard (AS) 3101 requires the audit report to communicate the critical audit matters (CAMs) beginning on fiscal year-ends on or after June 30, 2019 (December 15, 2020) for audits of the US's large accelerated filers (all other companies) (PCAOB 2017). ARD, CAMs, and KAMs, which are defined under auditing standards issued by FRC, PCAOB, and IAASB, respectively, are very similar and have commonalities in purpose and content.[35] In addition to the availability of historical data, the UK setting motivates our study for several reasons. Compared to the US, the UK's disclosure environment is less rich. For example, annual report narratives in the UK are

[34] As of June 17, 2017, auditors of the public interest entities (PIEs) in the UK include KAMs in their audit reports (FRC 2016). On the same date, the Regulation (EU) No 537/2014 of the European Parliament and of the Council of 16 April 2014, under Article 10, which acts in accordance with ISA 701, became effective in the EU.

[35] For more information and comparison between CAMs and KAMs, refer to Center for Audit Quality report (CAQ 2018).

voluntary while their counterpart in the US (10-K) is mandatory. In contrast to the US accelerated filers, companies and external auditors in the UK are not mandated to disclose the effectiveness of the internal controls. In a further difference to the US setting, the UK companies are not obligated to file quarterly financial reports (this also reduces the problem of confounding corporate disclosures for our study). Finally, the UK auditors are less prone to litigation risk and regulatory sanctions, compared to those in the US, making it more likely for them to release information content disclosure and thus, the changes to the audit report would be found useful to companies' capital market environment (Leuz and Verrecchia, 2000; Carcello and Li, 2013; Doyle and Magilke, 2013; Leuz and Wysocki, 2016; Lennox et al., 2019). The release of the UK ISA (700) only four months before the effective date, reducing complying companies' and capital market anticipation, strengthens this expectation and, importantly, enables a powerful research design.

3.3. Theory

The information content of the expanded audit report, which focuses on the risk of material misstatements and goes beyond the traditional standardized pass/fail audit opinion on the financial statements, is consistent with the notion that a firm's commitment to expanded levels of disclosure should alleviate the agency problem (e.g., Verrecchia, 1982; Diamond, 1985; Healy and Palepu, 2001; Lambert et al., 2007). Broadly, conveying risk information allows market participants to assess the riskiness and uncertainties regarding the firm's future cash flows (Linsley and Shrives, 2006). Ryan (2012) indicates that risk-related information is informative when it reflects exposures to market, credit, liquidity, information risks, and variation in firms' future economic performance. According to Thai and Birt (2019), conveying risk-related information is of particular interest to market participants for several reasons. For example, risk disclosure shows a firm's riskiness that may affect the discount rate in valuation models, mitigates the risk of adverse selection (Akerlof, 1970), reduces information asymmetry and uncertainty over the variance of the firm's cash flows, and hence reduces the cost of capital (Heinle and Smith, 2017).

Prior research indicates that risk-related information is important to market participants to allow assessment of the firm risk profile (Linsley et al., 2006). It helps in monitoring purposes and assessing risks that a firm encounters and, thus, reflects management competency (Linsley and Shrives, 2005; Lajili and Zéghal, 2005). For example, information disclosed by the expanded audit report that reflects the firm's internal control mechanisms can be useful to market participants in terms of the decision-making process. Such information is valued by the market since it enhances the understanding of the firm's risk and reliability of its information (e.g., Jizi and Dixon, 2017). Thus, market participants are expected to use auditor expanded disclosures to analyze the firm, predict its performance, and in turn evolve their assessments. Then, disclosures might change market expectations, and this would be observed through the trading decisions (e.g., the gap between bid and ask prices) and the volatility of stock prices (Benston, 1967; Lajili and Zéghal, 2005).

Independent auditors are credible and formal intermediaries between managers and capital market participants. Therefore, the capital market participants are likely to look beyond the static accounting numbers, which are limited in detailing firm risk, and to consider the auditor's expanded reporting to understand the firm's risk and value of its equity (Jizi and Dixon, 2017). Having insights about the risk of material misstatements gives an understanding of the firm's risk exposure in relation to many factors such as internal controls effectiveness, changes in interest rates, commodities market values, and currency rates, and thence financial reporting reliability (e.g., Scholes, 2000). The market is, therefore, expected to respond to the credible information disseminated by the independent auditor. This response can be observed in the form of impacts on information asymmetry and risk perceptions (e.g., Lambert et al., 2007; Easley and O'Hara, 2004; Healy and Palepu, 2001; Helbok and Wagner, 2006; Fama, 1991; Fama et al., 1969).

3.4. Literature Review and Hypothesis Development

Evidence on the possible benefits of the expanded audit report derives largely from experimental studies relating to CAMs/KAMs, with mixed results (for a review see Bédard et al., 2016). For example, Doxey (2015) and Kohler et al., (2016) find that experiment participants respond positively to CAMs/KAMs, which raises their perception about the company's financial reporting quality and economic position, leading them to increase their investment. Conversely, Christensen et al. (2014) and Kachelmeier et al. (2019) find that the participants become less confident in a company's accounts and decrease their investment. Further, Boolaky and Quick (2016) and Carver and Trinkle (2017) find that CAMs/KAMs do not represent a decision useful for participants. Moreover, experiments on auditors' disclaimers of responsibility or legal liability suggest that CAMs can either reduce auditor liability toward financial statement users (Brasel et al., 2016; Kachelmeier et al., 2019) or increase their perceived liability toward jurors (Gimbar, 2016; Backof et al., 2018).

Since the coming into effect of the expanded auditor's report in the UK, an emerging branch of studies exploits this real context to archivally explore its effect on investors' reaction.[36] Reid et al. (2015) find that complying companies significantly benefit from an increase in abnormal trading volume in the year following the adoption.[37] For a sample of two years surrounding the rule adoption, Gutierrez et al. (2018) find that neither the regulatory change nor the expanded auditor disclosure content significantly affect investors' reaction, proxied by cumulative absolute abnormal returns, abnormal trading volume, cumulative signed abnormal returns and abnormal return volatility. Similarly, Lennox et al. (2019) find that the number of risks disclosed by the auditors of the premium listed companies in the year following the rule adoption does not affect the signed cumulative abnormal returns. However, in Lennox et al.'s long-window tests using equity valuation

[36] As the expanded audit report becomes fully applicable in many countries in addition to the UK, a growing body of archival studies is expected to appear.

[37] The results of Reid et al. (2015) are, however, questionable because of the doubt about using mistaken event dates and because other measures of investors' reaction are not employed for robustness checks (see Lennox et al., 2019; Gutierrez et al., 2018).

models, the evidence they find suggests that ARD reliably reflects relevant financial reporting risks. Collectively, the short-window analysis seems to fail in finding a significant investors' reaction to the application of the expanded audit report or to the disclosure content. However, the theoretical foundation and prior empirical research on the economic consequences of disclosure, in general, and particularly risk disclosure suggest that more work can be done in exploring the possible benefits of the changes to the auditor's reporting.

In economic theory, principal-agent conflicts and information asymmetry result in a demand for a greater level of disclosure to narrow this informational gap and thus, alleviate the agency problem (e.g., Verrecchia, 1982; Diamond, 1985; Healy and Palepu, 2001; Lambert et al., 2007). The extant body of literature (e.g., Lev, 1988; Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; Verrecchia, 2001; Healy and Palepu, 2001; Bushman and Smith, 2001; Core, 2001; Easley et al., 2002; Easley and O'Hara, 2004; Lambert et al., 2007; Kothari et al., 2009; Leuz and Wysocki, 2016; Liu and Wysocki, 2017) posits that a higher level of public disclosure is associated with many economic benefits, including a reduction in a firm's information asymmetry (i.e., higher market liquidity), stock return volatility, analyst forecast dispersion, and cost of capital (i.e., a decrease in firm's risk). Kothari et al. (2009), additionally, provide evidence that the link between disclosure and its consequences (e.g., firm's risk) is strengthened when the source of that disclosure is credible and timely. Although the timeliness of independent auditor disclosure is questionable (Lennox et al., 2019), the credibility of this disclosure drives us to expect its usefulness to the firm's capital market environment.[38]

Therefore, consistent with the economic theory that considers the quality and quantity of accounting information and disclosure, we set forth the following prediction on firms' benefit from the new reporting rule. The theoretical model of Lambert et al. (2007) outlines that the quality of accounting information and disclosure negatively affects market participants' assessments of the variance of a firm's cash flow (idiosyncratic risk), and the covariance of the firm's cash flows with

[38] Investors show auditor independence as a main reason for demanding ARD (PCAOB, 2013).

the sum of all the cash flows in the market (beta risk) and thus, cost of capital. Following this, we develop a similar conjecture to that of Ashbaugh-Skaife et al. (2009) that, after all, the quality of accounting information and disclosure drives the risks of material misstatement disclosed by the auditor. In other words, high risks of material misstatement reflect the low quality of a firm's accounting disclosures and information systems. This low quality (expressed in high risks of material misstatement or less reliable financial reporting) is linked to a firm's information risk that manifests in cost of capital as defined in Lambert et al.'s (2007) framework, for several reasons. For example, within Lambert et al.'s (2007) framework, low quality of accounting information and disclosure influences the quality of a firm's real decisions such as operating decisions and managerial misappropriation, like the cash flow appropriated by the managers. Empirically consistent with this view, Ashbaugh-Skaife et al. (2009) posit and find that firms that disclose internal control deficiencies (resulting from a low-quality accounting information and disclosure system) show higher systematic risk, higher idiosyncratic risk, and higher cost of equity. Similarly, *ceteris paribus*, we postulate that the existence of higher risks of material misstatement is associated with greater information risk that translates into higher cost of equity. That is, the expanded auditor's report is not generic. Thus, the new reporting rule may yield benefits to the complying firms (those having relatively low risks of material misstatement, i.e., more reliable financial reporting) through lower systematic (beta) and unsystematic (idiosyncratic) risk and thus, a lower cost of capital.

Similar to the debate about the economic benefits of the expanded auditor's report, a policy debate arose around the usefulness of Section 404 of SOX (2002), which obligates both management and the independent auditor of accelerated filers in the US to separately disclose on the effectiveness of internal controls (for a review see Schneideret et al. (2009) and Chalmers et al. (2019)). Prior archival studies on the usefulness of internal control disclosure suggest that the disclosure of the effectiveness of internal control over financial reporting, which was not available before September 2004, is informative to the market participants, as captured by a higher cost of

equity (Ashbaugh-Skaife et al., 2009), negative stock return reactions (Beneish et al., 2008; Hammersley et al., 2008), and lower market liquidity (El-Mahdy and Park, 2014; Gupta et al., 2018). Likewise, as FRC's regulatory change makes valuable audit knowledge available to the market participants for the first time, aiming at affecting market information asymmetry and uncertainties, we expect to find the decision-usefulness of the expanded auditor's disclosure. Put differently, the economic consequences of the independent auditor disseminating credible risks of material misstatement (which reports the audited company's reporting reliability) to the investment community is thought likely to have a significant effect on market information asymmetry and financial statement users' risk perceptions.

Prior literature on corporate risk disclosure shows that market participants recognize risk information, as appears in their investment behaviors or assessment (for a review see Elshandidy et al. (2018)). For example, Kravet and Muslu (2013) argue that informative risk disclosure is likely to decrease (increase) investors' perceived risk if it is (un)expected and related to (un)known risk factors. Consistent with their expectations, the evidence they find suggests that a greater amount of risk disclosure in the 10-K filings is likely to diverge investors' risk perceptions, proxied by volatility of stock returns; implying that risk disclosure is informative.[39] Beyond that, Kothari et al. (2009) and Elshandidy and Shrives (2016) demonstrate that the tone of general and risk disclosures, reflecting favorable news, or unfavorable news, is directionally associated with the cost of capital, stock-return volatility, analyst forecast accuracy, and bid-ask spread. Focusing on risk-factor disclosure (Item 1A of the US 10-K filings), which became mandatory from December 2005, Campbell et al. (2014) find that the higher quantity of risk information is positively associated with the volatility of market returns, market beta, and market liquidity (proxied by bid-ask spread). Hope

[39] Similarly, longstanding audit research (e.g., Frost, 1997; Taffler et al., 2004; Citron et al., 2008; Menon and Williams, 2010) indicates that the market reacts negatively to auditor modified opinion, e.g., providing additional explanatory language casting doubt about a company's ability to remain as a going concern, particularly if it is not expected. Compared to the expanded auditor disclosure, a going concern opinion is, however, rare and represents a mere modification of the auditor's unqualified opinion, which implies that it is not significantly different from a pass/fail standard audit report (Gutierrez et al., 2018; Lennox et al., 2019).

et al. (2016), further, find that risk-factor disclosure is useful for financial statement users when it becomes more specific. It is noticeable that Item 1A is qualitatively similar to the first objective of FRC (2013a, paragraph 19A (a)), which requires the auditor to describe risks of material misstatement which had the greatest effect on the audit, in that it requires management to discuss the most significant factors that make the company uncertain or risky (SEC 2005, Regulation S-K, Item 503(c)). That is, corporate risk disclosure, which may lack both timeliness and credibility (Kothari et al., 2009), is meaningful to the market participants. These premises lead us to expect that the most credible risk disclosure, ARD, may also be useful and informative to the firm's capital market environment.

Given the above discussion, we hypothesize that, *ceteris paribus*, the new audit report regime and the content of the expanded audit report affect the information asymmetry and risk perceptions. It is worth noting that the risk information content of the expanded audit report basically relates to bad news, while auditor addressing of the risk would be regarded as good news about the risk. Interpreting each piece of risk information might be complicated or confusing to the average investor and thus, the signs related to the tone of the risk can be puzzling or insignificant (e.g., Kothari et al., 2009; KPMG 2013). Thus, to avoid this empirically problematic issue, we utilize auditor aggregate risk disclosure—examining the overall effect—without distinguishing the risk tone. With meaningful ARD, financial statement users' risk assessments are, therefore, expected to result in increase in a firm's market liquidity and users' risk perceptions. This expectation is consistent with the maintained assumptions of corporate general and risk disclosures (for more details see for example: Leuz and Verrecchia, 2000; Kothari et al., 2009; Kravet and Muslu, 2013; Campbell et al., 2014; Elshandidy and Shrives, 2016).[40]

[40] This also accords with the evidence provided by Akhigbe and Martin (2008) regarding capital market measures of risk following the passage of SOX for US financial services firms, where risk estimations are increased consistent with the mandatory nature of the enhanced disclosure and governance provisions with SOX.

3.5. Research Design

3.5.1. Sample selection and data collection

Table 3.1 displays the subsamples used to conduct our cross-sectional and intertemporal (panel) analyses. We first define the UK (equity) companies listed on the London Stock Exchange (LSE) on September 30, 2013, and their listing type (i.e., companies on the LSE Main Market with premium listing, and on the LSE AIM) using the Bloomberg database and LSE website.[41] We exclude financial companies (508) defined by the Industry Classification Benchmark (ICB) system adopted by LSE (this also excludes SIC 6000-6999) because of their distinct regulations and accounting practices (e.g., Carcello and Li, 2013; Gutierrez et al., 2018). Companies listed on UK AIM (624) are also excluded since they are not required to adopt the expanded audit report. Annual reports for companies with premium listing are collected from Thomson Reuters Eikon database (which we employ to manually collect data that are not available on electronic sources, like auditor fees). From each annual report, we extract the expanded audit report and manually and using a computer-aided text analysis program (Diction 7) we analyze ARD and materiality level (further details with definitions of variables are provided later). Financial and market data are obtained from Thomson Reuters Datastream database; we use IBES on Datastream to compile analysts data. Because the new auditor reporting regime is effective for companies with premium listing for fiscal years ending on or after September 30, 2013, in our cross-sectional analyses of idiosyncratic risk, systematic risk, and cost of equity, we keep only these companies (188; 376 firm-year observations) that have the necessary data for 2013 and 2014.

For our intertemporal analyses, our strongly balanced panel sample keeps only premium listed companies that have necessary data for our tests for the first two years of adopting the expanded auditor repot and the two prior years (i.e., for four full years from 2011 to 2014). Prior research (e.g., Lennox et al. 2019; Gutierrez et al., 2018; Reid et al., 2019; Livne et al., 2018) on the

[41] Companies listed on LSE's markets are available at: https://www.londonstockexchange.com/statistics/companies-and-issuers/companies-and-issuers.htm

expanded auditor's report suggests that using a sample of companies with different fiscal year ends and/or of early adopted companies along with later adopters as a possible reason for mixed and probably biased results. Therefore, our sample retains only firms with a fiscal year end on December 31 to synchronize the time period of premium listed companies, as well as to explore the impact of the new reporting regulation and ARD on the market assessments in a precise and timely fashion (e.g., Leuz and Verrecchia, 2000; Elshandidiy and Shrives, 2016). Table 3.1 reports the construction of our final panel sample, where there are 143 (139) companies with premium listing that have the necessary data to conduct our intertemporal tests of bid-ask spread, trading volume, and volatility (analyst forecast dispersion).[42] The following section sets out more insights into the research design.

Table 3.1.
Sample construction

	Firm observations	Firm-year observations
UK (equity) companies on the LSE on September 30, 2013	1597	
Exclude Sector (ICB) = Financials	-508	
Exclude companies listed on UK AIM	-624	
Non-financial UK premium listing companies on the LSE on September 30, 2013	465	
Less firms without identifiers (ISIN, SEDOL, or DS codes) or accessible annual reports	-68	
Revised sample (forwarded to A and B separately as follows)	397	
A- Cross-sectional sample for premium listed companies with FYE on or after September 30, 2013		
Less firms with missing necessary data, missing FYE, or FYE other than September 30 or after	-209	
Final sample of firms having the necessary data to conduct the cross-sectional analyses for idiosyncratic risk, systematic risk, and cost of equity	188	376
B- Panel sample for companies with FYE on December 31 and have complete data in the four years surrounding the regulatory rule in 2013		
Less firms with missing necessary data, missing FYE, changing FYE, or FYE other than December 31	-254	
Final sample of firms having the necessary data to conduct the intertemporal analyses for bid-ask spread, trading volume, and volatility	143	572
Final sample of firms having the necessary data to conduct the intertemporal analyses for analyst forecast dispersion	139	556

This table describes sample construction for our cross-sectional and intertemporal analyses. Our analyses employ premium listed companies that are required to comply with the expanded audit report.

[42] The number of observations employed in our analyses is not a possible limitation in this setting since it is consistent with practice of others in the similar contexts, e.g., Lennox et al. (2019) with 488, Thai and Birt (2019) with 91, Reid et al. (2015) with 582, Elshandidy and Shrives (2016) with 667, Eng and Mak (2003) with 158, Beretta and Bozzolan (2004) with 85, Leuz and Verrecchia (2000) with 102, and Botosan (1997) with 122.

3.6. Empirical Results and Discussion

3.6.1. Cross-sectional idiosyncratic risk, systematic risk, and cost of equity analyses

3.6.1.1. Descriptive statistics

Table 3.2 reports the descriptive statistics for 188 premium listed companies in the first year of adopting the expanded auditor's report, where Panel A shows the distributional properties of variables used in 2013 cross-sectional analyses of the relationship between the ARD (and materiality employed in the additional analyses) and idiosyncratic risk, systematic risk (beta) and cost of capital. We capture ARD using two measures: first, #RISK = the number of risks of material misstatement disclosed in the audit report (Lennox et al., 2019), second, %RISK = the percentage of the number of words indicating risk in the audit report scaled by the total number of words in the audit report, where textual analysis of the audit report is processed using Diction 7 software employing the risk wordlist of Elshandidy and Shrives (2016; see Appendix A).[43] Following Gutierrez et al. (2018), we measure materiality (MAT) = auditor disclosed materiality amount (£) for the financial statements as a whole, scaled by total assets.

Consistent with Ashbaugh-Skaife et al. (2009), we measure Idiosyncratic risk (I_RISK) and systematic risk (BETA) by estimating the following market model using monthly returns from 2013 and the prior four years (requiring a minimum of 24 and maximum of 60 months):

$$EXRET = B_0 + B_1 RMRF + e, \quad (3.1)$$

where I_RISK = standard deviation of residuals from the estimated market model; BETA = estimate of B_1 from the estimated market model; *EXRET* = the firm's monthly return minus the risk-free rate; *RMRF* = excess return on the market. Monthly data are obtained from (http://business-school.exeter.ac.uk/research/centres/xfi/famafrench/files/).

[43] Literature on risk disclosure provides other risk wordlists (e.g., that of Kravet and Muslu (2013)) without suggesting a most appropriate one. We utilize that of Elshandidy and Shrives (2016) because of its proven validity and reliability in many contexts including the UK (e.g., Elshandidy and Neri, 2015). Additionally, as it represents a developed and extended form of that of Kravet and Muslu (2013), we are able to test its validity in our context, where we find both risk wordlists in common capture a large proportion of ARD from the expanded audit report narratives (r = 83.3% at the 1% significance level).

Following Ashbaugh-Skaife et al. (2009), we control for firm fundamentals that are indicated to be related to I_RISK and BETA, as well as variables that are likely to impact corporate risk disclosure (Campbell et al., 2014) and ARD (Lennox et al., 2019). This helps to ensure that our measures of ARD are not proxying for other inherent risk determinants. These control variables are as follows:

SIZE = the natural log of market value of equity; BM = book value of equity divided by market value of equity; LEV = total debt divided by total assets; STD_CFO = five-year standard deviation of cash flow from operations divided by total assets, requiring a minimum of three years of data; CFO = cash flow from operations divided by total assets; RET = 12-month stock return over the firm's fiscal year, a continuous stream of 12 monthly returns is required; DIVPAY = one if the firm pays dividends, and zero otherwise; BIG4 = one for firms with a Big 4 auditor, and zero otherwise. INC = net income before extraordinary items divided by the lagged market value of equity; ANALYSTS = the natural log of the number of analysts, plus one, following the firm; GC = one if the auditor issues a going concern modification, and zero otherwise; CATA = current assets to total assets. Variables are measured as of a firm's 2013 fiscal year-end, unless otherwise mentioned. In addition, following prior studies (e.g., Lennox et al., 2019) all continuous variables are winsorized at 1% on both tails to mitigate the influence of outliers.

Consistent with Kothari et al. (2009), we measure the equity cost of capital (C_CAP) using Fama and French's (1993) three-factor model as follows:[44]

$$EXRET = B_0 + B_1 RMRF + B_2 SMB + B_3 HML + e, \quad (3.2)$$

[44] Compared to other approaches to estimate cost of capital, such as the implied cost of capital estimation, Kothari et al. (2009) demonstrate that Fama and French three-factor model is the most appropriate for studying the association between cost of capital and disclosures. They also indicate how the three-factor model is consistent with the analysis in Lambert et al. (2007). Furthermore, the three-factor model enables us to obtain sufficient sample size since utilizing the implied cost of capital estimates imply the need for analyst forecasts, which typically available only for the UK's larger firms.

Table 3.2.
Panel A: Descriptive statistics on variables used in the cross-sectional analyses

Variable	Mean	Median	Std. Dev.	Q1	Q3
Dependent variables:					
I_RISK	0.099	0.083	0.050	0.068	0.119
BETA	0.985	0.908	0.624	0.499	1.377
C_CAP	0.072	0.060	0.054	0.033	0.099
Explanatory variables:					
#RISK	4.101	4.000	1.374	3.000	5.000
%RISK	1.232	1.228	0.359	0.955	1.487
MAT	0.009	0.006	0.016	0.004	0.010
Control variables:					
SIZE	13.671	13.804	2.102	12.372	14.988
BM	0.594	0.429	0.722	0.239	0.726
LEV	0.196	0.170	0.200	0.061	0.276
STD_CFO	0.047	0.025	0.081	0.015	0.046
CFO	0.094	0.099	0.117	0.059	0.143
RET	0.020	0.021	0.031	0.005	0.037
DIVPAY	0.819	1.000	0.386	1.000	1.000
BIG4	0.931	1.000	0.254	1.000	1.000
INC	0.025	0.057	0.164	0.025	0.084
ANALYSTS	2.256	2.441	0.895	1.609	2.944
DISTRESS	0.170	0.000	0.377	0.000	0.000
GC	0.032	0.000	0.176	0.000	0.000
CATA	0.422	0.382	0.210	0.270	0.543

Panel B: Pearson (top) and Spearman (bottom) correlation coefficients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 I_RISK		**0.272**	**0.383**	-0.016	0.071	**0.195**	**-0.452**	**0.267**	**0.208**	**0.350**	**-0.409**	-0.008	**-0.456**	-0.116	**-0.333**	**-0.348**	**0.429**	**0.502**	**0.122**
2 BETA	**0.227**		**0.944**	0.068	0.106	**-0.135**	**0.261**	-0.031	0.051	-0.084	0.097	0.081	0.020	**0.268**	-0.008	**0.246**	0.010	-0.033	**-0.137**
3 C_CAP	**0.305**	**0.945**		0.055	**0.137**	-0.105	**0.137**	-0.007	0.099	-0.031	-0.014	0.047	-0.063	**0.211**	**-0.122**	**0.159**	**0.143**	0.024	-0.100
4 #RISK	-0.072	0.090	0.057		0.117	**-0.214**	**0.232**	0.100	**0.159**	**-0.165**	-0.017	**-0.121**	-0.036	0.035	**-0.149**	**0.154**	0.091	0.053	**-0.187**

5 %RISK	0.039	**0.144**	**0.124**	0.118		-0.030	0.048	0.025	0.107	-0.032	-0.100	**-0.139**	**-0.160**	0.005	**-0.189**	0.037	**0.265**	0.083	-0.044
6 MAT	0.013	-0.063	-0.085	-0.062	-0.014		**-0.134**	**-0.126**	**0.172**	**0.810**	**-0.228**	0.038	**-0.141**	**-0.183**	-0.082	-0.070	**0.180**	**0.382**	**0.242**
7 SIZE	**-0.563**	**0.261**	**0.149**	**0.209**	0.054	0.058		**-0.374**	0.017	**-0.249**	**0.390**	-0.019	**0.282**	**0.433**	**0.211**	**0.771**	**-0.199**	**-0.252**	**-0.306**
8 BM	**0.263**	0.034	0.119	0.021	0.024	**-0.273**	**-0.407**		**-0.219**	-0.007	**-0.256**	**-0.392**	**-0.353**	**-0.196**	**-0.347**	**-0.198**	**0.273**	**0.346**	-0.118
9 LEV	-0.110	**0.158**	**0.123**	**0.285**	**0.138**	**-0.180**	**0.231**	**-0.165**		**0.168**	**-0.227**	**-0.140**	**-0.165**	-0.037	**-0.175**	0.063	**0.285**	**0.188**	**-0.171**
10 STD_CFO	**0.366**	0.030	0.021	-0.043	0.009	**0.515**	**-0.137**	-0.104	**-0.229**		**-0.359**	-0.035	**-0.338**	**-0.197**	**-0.210**	**-0.154**	**0.220**	**0.391**	**0.299**
11 CFO	**-0.263**	0.026	-0.070	-0.047	**-0.123**	**0.452**	**0.352**	**-0.571**	-0.060	**0.318**		**0.201**	**0.417**	**0.254**	**0.418**	**0.315**	**-0.430**	**-0.595**	-0.083
12 RET	**0.131**	**0.173**	**0.177**	**-0.160**	-0.040	**-0.169**	-0.052	**-0.255**	**-0.182**	-0.085	0.104		**0.244**	0.011	**0.395**	**-0.147**	**-0.342**	**-0.226**	**0.224**
13 DIVPAY	**-0.387**	0.064	0.013	-0.022	**-0.156**	-0.098	**0.268**	**-0.286**	-0.027	**-0.321**	**0.337**	**0.168**		0.035	**0.477**	**0.184**	**-0.523**	**-0.386**	0.034
14 BIG4	-0.104	**0.253**	**0.223**	0.024	0.021	-0.118	**0.372**	**-0.193**	0.066	-0.056	**0.152**	0.010	0.035		0.073	**0.252**	-0.100	**-0.189**	**-0.176**
15 INC	-0.080	**0.156**	0.116	-0.091	-0.099	-0.100	0.001	0.015	**-0.139**	-0.071	**0.234**	**0.412**	**0.380**	-0.004		0.056	**-0.662**	**-0.345**	0.034
16 ANALYSTS	**-0.468**	**0.199**	0.109	**0.165**	0.033	**0.150**	**0.845**	**-0.284**	**0.242**	-0.052	**0.323**	**-0.196**	**0.179**	**0.233**	-0.078		-0.075	**-0.160**	**-0.297**
17 DISTRESS	**0.340**	-0.025	0.071	0.100	**0.237**	0.109	**-0.157**	**0.177**	**0.158**	**0.156**	**-0.394**	**-0.257**	**-0.523**	-0.100	**-0.632**	-0.061		**0.401**	-0.053
18 GC	**0.287**	-0.070	-0.029	0.080	0.099	**0.245**	**-0.204**	0.052	0.069	**0.207**	**-0.283**	**-0.144**	**-0.386**	**-0.189**	**-0.274**	**-0.151**	**0.401**		0.057
19 CATA	**0.165**	-0.102	-0.092	**-0.181**	-0.031	**0.129**	**-0.264**	**-0.165**	**-0.342**	**0.159**	0.008	**0.263**	0.028	**-0.148**	0.089	**-0.292**	-0.045	0.051	

Panel A of this table presents summary statistics for variables used in 2013 cross-sectional analyses of idiosyncratic risk, systematic risk (beta) and cost of capital (firm observations = 188 premium listed companies). Panel B of this table reports the correlation coefficients. Bold numbers in Panel B indicate significance based on two-tailed t-tests, at the 0.1 level or better. Variable definitions and measures are as follows.

I_RISK = standard deviation of residuals from estimating market model $EXRET = B_0 + B_1 RMRF + e$ using monthly returns from 2013 and the prior four years (requiring a minimum of 24 months), where *EXRET* = the firm's monthly return minus the risk-free rate; *RMRF* = excess return on the market; BETA = estimate of B_1 from the mentioned market model using monthly returns requiring a minimum of 24 and maximum of 60 months over 2013 and the prior four fiscal years; C_CAP = expected annual cost of capital calculated based on the Fama-French three-factor model $EXRET = B_0 + B_1 RMRF + B_2 SMB + B_3 HML + e$ using monthly returns requiring a minimum of 24 and maximum of 60 months over 2013 and the prior four fiscal years; where *SMB* = the size factor defined as small minus big firm returns; *HML* = the book-to-market factor defined as high minus low book-to-market firm returns; *EXRET* and *RMRF* as previously defined. Monthly data obtained from (http://business-school.exeter.ac.uk/research/centres/xfi/famafrench/files/). #RISK = the number of risks of material statement disclosed in the audit report; %RISK = the percentage of the number of words indicating risk in the audit report scaled by the total number of words in the audit report, where textual analysis of the audit report is processed using Diction 7 software employing the risk wordlist of Elshandidy and Shrives (2016). MAT = auditor disclosed materiality amount (£) for the financial statements as a whole, scaled by total assets; SIZE = the natural log of market value of equity; BM = book value of equity divided by market value of equity; LEV = total debt divided by total assets; STD_CFO = five-year standard deviation of cash flow from operations divided by total assets, requiring a minimum of three years of data; CFO = cash flow from operations divided by total assets; RET = 12-month stock return over the firm's fiscal year, a continuous stream of 12 monthly returns is required; DIVPAY = one if the firm pays dividends, and zero otherwise; BIG4 = one for firms with a Big 4 auditor, and zero otherwise. INC = net income before extraordinary items divided by the lagged market value of equity; ANALYSTS = the natural log of the number of analysts, plus one, following the firm; GC = one if the auditor issues a going concern modification, and zero otherwise; CATA = current assets to total assets.

All continuous variables are winsorized at 1% on both tails. Variables are measured as of a firm's 2013 fiscal year-end, unless otherwise mentioned.

Consistent with Kothari et al. (2009), we measure the equity cost of capital (C_CAP) using Fama and French's (1993) three-factor model as follows:[45]

$$EXRET = B_0 + B_1 RMRF + B_2 SMB + B_3 HML + e, \quad (3.2)$$

where $EXRET$ and *RMRF* are as previously defined under Eq. (3.1). *SMB* = the size factor defined as small minus big firm returns; *HML* = the book-to-market factor defined as high minus low book-to-market firm returns. Eq. (3.2) is also estimated using monthly returns requiring a minimum of 24 and maximum of 60 months over 2013 and the prior four fiscal years, where data are obtained from (http://business-school.exeter.ac.uk/research/centres/xfi/famafrench/files/). In order to estimate C_CAP, the estimated coefficients loading on *RMRF, SMB,* and *HML* are multiplied by the average returns for the three factors from 1981-2012. For each firm, this number is then annualized giving our measure of C_CAP. As in Kothari et al. (2009), we also control for SIZE, BM, and LEV with a definition as previously displayed under Eq. (3.1).

The descriptive statistics (means) reported in Table 3.2 indicate that auditor disclosures show about 4, 1.232%, and 0.9% #RISK, %RISK, and MAT, respectively. These variables' inter-quartiles ranging from 3, 0.955%, and 0.4% to 5, 1.487%, and 1%, respectively, imply a significant cross-sectional variation in the content of the expanded audit report. These descriptive statistics are qualitatively consistent with prior research (e.g., Lennox et al., 2019; Gutierrez et al., 2018), suggesting that our sample firms are representative of prior studies. Additionally, for information risk measures, I_RISK, BETA, and C_CAP for the sample firms are, on average, 0.099, 0.985, and 0.072, respectively. Also, these variables' inter-quartiles ranging from 0.068, 0.499, and 0.033 to 0.119, 1.377, and 0.099, respectively, imply a significant cross-sectional variation in the information risk measures.

[45] Compared to other approaches to estimate cost of capital, such as the implied cost of capital estimation, Kothari et al. (2009) demonstrate that Fama and French three-factor model is the most appropriate for studying the association between cost of capital and disclosures. They also indicate how the three-factor model is consistent with the analysis in Lambert et al. (2007). Furthermore, the three-factor model enables us to obtain sufficient sample size since utilizing the implied cost of capital estimates imply the need for analyst forecasts, which typically available only for the UK's larger firms.

Panel B of Table 3.2 reports the bivariate correlations for all variables used in 2013 cross-sectional analyses, where Pearson (Spearman) correlations are above (below) the diagonal. As expected, and consistent with prior research (e.g., Ashbaugh-Skaife et al., 2009), the three information risk measures of I_RISK, BETA, and C_CAP are strongly correlated. In addition, while #RISK shows no significant correlation, %RISK and MAT show significant correlations with information risk measures, particularly with BETA, and C_CAP. In order to assess the extent to which ARD (and later the disclosed materiality) relate to the information risk measures, we turn to multivariate analyses.[46]

3.6.1.2. Cross-sectional information risk and cost of equity results

We start our empirical analysis by testing the relationship between ARD and I_RISK, BETA, and C_CAP since these information risk measures predate the first ARD. Thus, they show whether market participants' assessment of idiosyncratic risk, beta, and cost of equity incorporates expectations about the risks of material misstatement based on observable firm characteristics prior to the auditor's initial disclosure of that material risks (Ashbaugh-Skaife et al., 2009). Accordingly, we examine whether firms with higher ARD (#RISK, and %RISK) present higher I_RISK, BETA, and C_CAP using an ordinary least squares (OLS) regression that controls for other variables that previous studies show to be related to I_RISK, BETA, and C_CAP (e.g., Ashbaugh-Skaife et al., 2009; Kothari et al., 2009; Campbell et al., 2014). Specifically, we estimate the following models:

$$I\_RISK\ or\ BETA = \beta_0 + \beta_1 \#RISK\ or\ \%RISK + \beta_2 SIZE + \beta_3 BM + \beta_4 LEV + \beta_5 STD\_CFO + \beta_6 CFO + \beta_7 RET + \beta_8 DIVPAY + \beta_9 BIG4 + \beta_{10} INC + \beta_{11} ANALYSTS + \beta_{12} DISTRESS + \beta_{13} GC + \beta_{14} CATA + \varepsilon, \quad (3.3)$$

$$C\_CAP = \beta_0 + \beta_1 \#RISK\ or\ \%RISK + \beta_2 SIZE + \beta_3 BM + \beta_4 LEV + \varepsilon, \quad (3.4)$$

where all variables are as previously defined.

[46] Throughout the cross-sectional and intertemporal analyses, we evaluate the effects of multicollinearity by calculating the variance inflation factors (VIFs) for each independent variable entered in the multivariate regressions. With VIFs less than 10, we conclude that multicollinearity is not a concern.

Table 3.3.
Cross-sectional analyses of firm's information risk and auditor risk disclosure

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	I_RISK	I_RISK	BETA	BETA	C_CAP	C_CAP
#RISK	0.003		0.021		0.001	
	(1.174)		(0.602)		(0.332)	
%RISK		0.007		0.246**		0.019*
		(0.921)		(1.977)		(1.769)
SIZE	-0.009***	-0.008***	0.021	0.017	0.003	0.003
	(-3.390)	(-3.282)	(0.527)	(0.446)	(1.418)	(1.418)
BM	0.004	0.005	0.084	0.098	0.001	-0.000
	(0.786)	(1.009)	(0.969)	(1.160)	(0.079)	(-0.015)
LEV	0.038**	0.042**	0.201	0.239	0.015	0.013
	(2.258)	(2.529)	(0.757)	(0.922)	(0.721)	(0.609)
STD_CFO	0.038	0.034	-0.335	-0.275		
	(0.923)	(0.827)	(-0.517)	(-0.431)		
CFO	-0.008	-0.008	-0.305	-0.300		
	(-0.256)	(-0.245)	(-0.602)	(-0.598)		
RET	0.536***	0.550***	6.455***	6.940***		
	(4.608)	(4.675)	(3.514)	(3.783)		
DIVPAY	-0.012	-0.012	-0.028	0.002		
	(-1.281)	(-1.191)	(-0.180)	(0.012)		
BIG4	0.036***	0.035***	0.635***	0.656***		
	(2.924)	(2.871)	(3.266)	(3.425)		
INC	0.001	-0.003	-0.048	-0.061		
	(0.035)	(-0.114)	(-0.129)	(-0.166)		
ANALYSTS	-0.001	-0.001	0.106	0.111		
	(-0.184)	(-0.252)	(1.357)	(1.441)		
DISTRESS	0.021**	0.019*	0.008	-0.050		
	(2.003)	(1.780)	(0.048)	(-0.305)		
GC	0.083***	0.084***	0.109	0.117		
	(4.068)	(4.101)	(0.338)	(0.368)		
CATA	0.005	0.005	-0.108	-0.120		
	(0.307)	(0.312)	(-0.447)	(-0.500)		
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.163***	0.158***	-0.359	-0.593	0.019	0.001
	(4.986)	(4.683)	(-0.697)	(-1.130)	(0.500)	(0.027)
Observations	188	188	188	188	188	188
Adj. R-squared	0.494	0.492	0.186	0.203	0.0610	0.0770

This table reports the coefficient estimates from the OLS estimation of I_RISK (idiosyncratic risk), BETA (systematic risk), and C_CAP (cost of equity capital) on the #RISK and %RISK (measures of auditor risk disclosure). Following Ashbaugh-Skaife et al. (2009), I_RISK and BETA are estimated from the market model (CAPM), while following Kothari et al. (2009), C_CAP is estimated from the Fama-French three-factor model. See Table 3.2 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

Following prior literature (e.g., Ashbaugh-Skaife et al., 2009; Kothari et al., 2009; Campbell et al., 2014; Lennox et al., 2019), we predict *#RISK, %RISK, LEV, STD_CFO, DISTRESS, GC* (*SIZE, CFO, DIVPAY,* and *INC*) to have positive (negative) coefficients with *I_RISK*, and *BETA*. Following that literature also, we draw no predictions for *BM, RET, BIG4, ANALYSTS,* and *CATA* since both directions are expected. For C_CAP, we predict a positive (negative) coefficient on *#RISK, %RISK, BM,* and *LEV* (*SIZE*).

The six models of Table 3.3 report the results of estimating Eq. (3.3) and Eq. (3.4), where we find a significantly positive association only between %RISK and both BETA and C_CAP (t-statistics are 1.977 and 1.769 at the 5% and 10% levels, respectively). The statistically insignificant estimates for #RISK are consistent with the descriptive statistics. #RISK results are also in line with prior research focusing only on the number of risks disclosed by the auditor (e.g., Gutierrez et al., 2018; Lennox et al., 2019). Therefore, considering the information content of the expanded audit report, rather than focusing only on the number of risks, seems important to derive significant inferences about ARD. We also aim to verify this in the following analyses. Turning to %RISK, the positive and significant finding suggests that firms that receive an expanded audit report with higher level of risk disclosure exhibit higher BETA and C_CAP. That is, auditors devote a greater amount of risk disclosure to firms that present higher information risk to shareholders in terms of the covariances in cash flows (BETA) and cost of capital (C_CAP).[47] Specifically, the economic significance of our finding suggests that, all else being equal, a one-standard-deviation increase in the %RISK variable is associated with about 8.8% (0.359 * 0.246), and 0.7% (0.359 * 0.019) increase in BETA, and C_CAP, respectively.

[47] In untabulated analyses, following the empirical work by Ashbaugh-Skaife et al. (2009), we expand C_CAP Eq. (3.4) by first including the additional control variables used in I_RISK and BETA Eq. (3.3), where we find qualitatively similar findings (only %RISK is significant with a t-statistic of 1.7 at the 10% level). Second, we run Eq. (3.4) incorporating I_RISK and BETA. Consistent with Ashbaugh-Skaife et al. (2009), and as expected, coefficient estimates for both risk factors are found highly significant at 1%. We also derive qualitatively similar findings for ARD where only %RISK is significant with a slightly better t-statistic of 1.9 at the 10% level.

These results support the notion that the new reporting rule may yield benefits to the complying firms, which have relatively low risks of material misstatement, through a lower information risk and a lower cost of capital. They also suggest that such information is not generic, leading to expect economic usefulness of the reporting regulation change and informative content of the expanded audit report.

3.6.1.3. Materiality disclosure cross-sectional analysis (auditor perspective)

As stated earlier, in addition to disclosing the risks of material misstatement, the revised ISA 700 (UK and Ireland) requires the independent auditor of the premium listed companies to explain the concept of materiality in planning and performing. Specifically, the auditor is required to determine the materiality threshold used for the financial statements as a whole. In the context of the audit, materiality is organized by ISA (UK and Ireland) 320 (FRC 2009), and accordingly affected by the procedures, nature, and the extent of the risk assessment and misstatements identified in the previous and current audits. Therefore, as noted earlier, auditor exercise of professional judgment on materiality is mainly related to the assessed and identified risks of material misstatement. In this relationship, a higher (lower) level of current or expected risks of material misstatement provides a basis for the auditor to set a lower (higher) materiality threshold and vice versa (FRC 2009).

Consequently, in order to validate our cross-sectional results of ARD and information risk measures, in Eq. (3) and Eq. (4), we replace #RISK, and %RISK by MAT with the expectation of finding negative association with I_RISK, BETA, and C_CAP. Consistent with our expectation, models 1, 2, and 3 of Table 3.4 show significantly negative association between MAT and I_RISK (t-statistic of -2.056 at the 5% level), BETA (t-statistic of -1.897 at the 10% level), and C_CAP (t-statistic of -1.667 at the 10% level). The economic significance of this finding indicates that auditors determine a higher level of materiality for firms that exhibit lower information risk to shareholders in terms of I_RISK, BETA, and C_CAP. Specifically, all else being equal, a one-standard-deviation

increase in MAT variable is associated with about -1% (0.016 * -0.650), -15.1% (0.016 * -9.464), and -0.7% (0.016 * -0.418) decrease in I_RISK, BETA, and C_CAP, respectively.[48] These findings uphold our previous ARD results and our assumption that firms complying with the new reporting rule can benefit from a lower information risk and a lower cost of capital. Again, this evidence leads us to expect economic consequences contingent on the disclosed materiality level.

Table 3.4.
Cross-sectional analyses of firm's information risk and auditor disclosed materiality

	(1)	(2)	(3)
VARIABLES	I_RISK	BETA	C_CAP
MAT	-0.650**	-9.464*	-0.418*
	(-2.056)	(-1.897)	(-1.667)
SIZE	-0.008***	0.027	0.003
	(-3.229)	(0.713)	(1.158)
BM	0.003	0.060	-0.001
	(0.567)	(0.696)	(-0.192)
LEV	0.040**	0.210	0.021
	(2.449)	(0.809)	(1.007)
STD_CFO	0.134**	1.115	
	(2.074)	(1.093)	
CFO	0.005	-0.110	
	(0.163)	(-0.215)	
RET	0.525***	6.293***	
	(4.543)	(3.456)	
DIVPAY	-0.009	0.027	
	(-0.893)	(0.172)	
BIG4	0.032**	0.584***	
	(2.605)	(3.043)	
INC	0.001	-0.015	
	(0.054)	(-0.042)	
ANALYSTS	-0.002	0.100	
	(-0.331)	(1.299)	
DISTRESS	0.025**	0.071	
	(2.373)	(0.429)	
GC	0.097***	0.301	
	(4.561)	(0.903)	
CATA	0.004	-0.120	
	(0.271)	(-0.501)	
Industry FE	Yes	Yes	Yes

[48] Again, when we run Eq. (3.4) incorporating I_RISK and BETA, the unreported results are consistent with Ashbaugh-Skaife et al. (2009) where coefficient estimates for both risk factors are found highly significant at 1%. We also find a qualitatively similar finding, where MAT is significant with a better t-statistic of -2.3 at the 5% level. This confirms Ashbaugh-Skaife et al.'s (2009) suggestion of including I_RISK and BETA to better estimate C_CAP.

Constant	0.167***	-0.312	0.039
	(5.168)	(-0.613)	(1.014)
Observations	188	188	188
Adj. R-squared	0.503	0.201	0.0751

This table reports the coefficient estimates from the OLS estimation of I_RISK (idiosyncratic risk), BETA (systematic risk), and C_CAP (cost of equity capital) on MAT (auditor disclosed materiality). Following Ashbaugh-Skaife et al. (2009), I_RISK and BETA are estimated from the usual market model (CAPM), while following Kothari et al. (2009), C_CAP is estimated from the Fama-French three-factor model. See Table 3.2 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

3.6.1.4. An extended analysis through successive years

The above-reported cross-sectional results suggest that information disseminated by the expanded audit report is associated with variances in cash flows (I_RISK), covariances in cash flows (BETA) and thus, the cost of capital (Lambert et al., 2007). We, however, consider it useful to extend this analysis by conducting two-year examinations for the cause-effect relation between ARD (i.e., #RISK and %RISK) and MAT and information risk measures (i.e., I_RISK, BETA, and C_CAP).[49] We start by expanding our cross-sectional sample to include firms with complete data for 2013 and 2014 (376 firm-year observations). In Panel A of Table 3.5, where we run Eq. (3) and Eq. (4) through 2013 and 2014, we find confirmation of the cross-sectional results. Specifically, we find significantly positive relations between #RISK and I_RISK (t-statistic of 2.083 at the 5% level), %RISK and BETA (t-statistic of 2.524 at the 5% level) and C_CAP (t-statistic of 1.929 at the 10% level), and significantly negative relations between MAT and BETA (t-statistic of -1.927 at the 10% level) and C_CAP (t-statistic of -1.716 at the 10% level).

As a further test, we examine whether #RISK, %RISK, and MAT are proxying for the information risk that a firm may present to investors in the future. Therefore, we re-estimate Eq. (3.3) and Eq. (3.4) with the dependent information risk measures (i.e., I_RISK, BETA, and C_CAP) measured in $y = t+1$ (i.e., 2014 and 2015), whilst #RISK, %RISK and MAT (as well as the control variables) are measured in $y = t$ through 2013 and 2014. The results reported by Panel

[49] In these tests, we measure I_RISK, BETA, and C_CAP using Eq. (3.1) and Eq. (3.2) employing a rolling window of five years of monthly returns (requiring a minimum of 24 and a maximum of 60 months) ending in the year under examination.

B of Table 3.5, as expected, indicate that firms with relatively higher (lower) level of ARD (materiality) are associated with higher information risk measures in the following period. Specifically, we find significant positive coefficients on #RISK in I_RISK_{it+1} analysis (t-statistic of 2.017 at the 5% level), %RISK in $BETA_{it+1}$ (t-statistic of 3.433 at the 1% level) and C_CAP_{it+1} analyses (t-statistic of 2.826 at the 1% level). Additionally, we find significant negative coefficients on MAT in I_RISK_{it+1} (t-statistic of -1.859 at the 10% level) and $BETA_{it+1}$ (t-statistic of -1.881 at the 10% level) analyses.

Table 3.5.
Panel A: Cross-sectional analyses of firm's information risk and auditor risk and materiality disclosures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	I_RISK	I_RISK	I_RISK	BETA	BETA	BETA	C_CAP	C_CAP	C_CAP
#RISK	0.003**			0.020			0.000		
	(2.083)			(0.759)			(0.213)		
%RISK		0.002			0.230**			0.017*	
		(0.438)			(2.524)			(1.929)	
MAT			-0.359			-10.928*			-0.466*
			(-1.138)			(-1.927)			(-1.716)
Control Variables	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.173***	0.172***	0.178***	0.168	-0.086	0.268	0.063*	0.047	0.082**
	(7.400)	(6.687)	(7.717)	(0.364)	(-0.191)	(0.612)	(1.831)	(1.445)	(2.234)
Observations	376	376	376	376	376	376	376	376	376
Adj. R-squared	0.536	0.528	0.531	0.195	0.214	0.209	0.103	0.118	0.112

Panel B: Cross-sectional analyses of firm's information risk measures in the period following auditor risk and materiality disclosures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	I_RISK_{t+1}	I_RISK_{t+1}	I_RISK_{t+1}	$BETA_{t+1}$	$BETA_{t+1}$	$BETA_{t+1}$	C_CAP_{t+1}	C_CAP_{t+1}	C_CAP_{t+1}
#RISK	0.003**			0.010			-0.000		
	(2.017)			(0.397)			(-0.039)		
%RISK		-0.001			0.270***			0.023***	
		(-0.137)			(3.433)			(2.826)	
MAT			-0.628*			-11.013*			-0.415
			(-1.859)			(-1.881)			(-1.469)
Control Variables	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.182***	0.184***	0.188***	0.068	-0.235	0.165	0.103***	0.081**	0.120***
	(8.268)	(7.648)	(8.804)	(0.163)	(-0.580)	(0.406)	(3.166)	(2.544)	(3.301)

Observations	376	376	376	376	376	376	376	376	376
Adj. R-squared	0.624	0.615	0.625	0.261	0.294	0.279	0.130	0.158	0.138

Panels A and B of this table report the coefficient estimates from the OLS estimation of I_RISK (idiosyncratic risk), BETA (systematic risk), and C_CAP (cost of equity capital) on the #RISK, %RISK (measures of auditor risk disclosure) and MAT (auditor disclosed materiality). Following Ashbaugh-Skaife et al. (2009), I_RISK and BETA are estimated from the market model (CAPM), while following Kothari et al. (2009), C_CAP is estimated from the Fama-French three-factor model. I_RISK, BETA, and C_CAP are measured using a rolling window of five years of monthly returns (requiring a minimum of 24 and a maximum of 60 months) ending on the fiscal year-end under examination. Panel A presents I_RISK, BETA, C_CAP as measured in (*y = t)* 2013 and 2014. Panel B presents I_RISK_{t+1}, $BETA_{t+1}$, C_CAP_{t+1} as measured in (*y = t+1)* 2014 and 2015. Other variables are measured (in *y = t*) as of a firm's fiscal year-ending on 2013 and 2014. Control variables are included as shown in Tables 3.3 and 3.4. See Table 3.2 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1

To sum up, the results presented in Table 3.3 through Table 3.5 show evidence consistent with expanded auditor's disclosure is not generic, rather it is associated with the information risk that a firm presents to investors. Therefore, firms complying with the new reporting rule, which have relatively more reliable financial reporting, i.e., have relatively low risks of material misstatement inducing the auditor to specify a high level of materiality, can benefit from a lower information risk and a lower cost of capital.

3.6.2. Intertemporal analyses of the usefulness of auditor reporting regime change and the informativeness of auditor risk disclosures

3.6.2.1. Descriptive statistics

In the cross-sectional analyses we investigate whether a firm's risks attributable to systematic, unsystematic and cost of capital risks are manifest in ARD (and materiality threshold). Now, we move to examine the usefulness of auditor reporting regime change and the informativeness of ARD using intertemporal analyses. The descriptive statistics reported in Table 3.6 display the distributional properties of the variables used in the intertemporal analyses. These distributional properties are shown for premium listed companies during the period before (POST=0) and the period after (POST=1) the reporting regulation. The difference-in-means using *t-test* are also reported. The usefulness of the new audit report regime to the capital market environment is measured consistent with prior research using firm's market liquidity and users' risk perceptions as follows.

Table 3.6.
Descriptive statistics on variables used in the intertemporal analyses

VARIABLE	Obs.	Mean	Median	Std. Dev.	Q1	Q3	Obs.	Mean	Median	Std. Dev.	Q1	Q3	Diff t-stat.
	POST=0						POST=1						
Dependent variables:													
$SPREAD_{it+1}$	286	0.013	0.002	0.032	0.001	0.011	286	0.011	0.002	0.023	0.001	0.008	0.756
$TVOL_{it+1}$	286	1.913	1.686	1.204	1.169	2.454	286	2.031	1.685	1.430	1.017	2.772	-1.066
SD_{it+1}	286	0.017	0.016	0.008	0.013	0.020	286	0.020	0.017	0.010	0.014	0.023	-3.703***
$DISP_{it+1}$	278	0.142	0.041	0.446	0.023	0.077	278	0.173	0.042	0.516	0.025	0.099	-0.757
Control variables:													
$SIZE_{it}$	286	13.507	13.645	2.104	12.178	14.773	286	13.729	13.845	2.065	12.493	15.049	-1.27
$TVOL_{it}$	286	2.318	1.968	1.448	1.373	3.034	286	2.030	1.802	1.246	1.210	2.637	2.547**
SD_{it}	286	0.021	0.020	0.009	0.016	0.024	286	0.018	0.017	0.008	0.013	0.021	4.165***
$Float_{it}$	286	83.186	93.360	21.484	77.920	98.240	286	84.193	95.105	21.296	78.240	98.400	-0.562
$BETA_{it}$	286	1.028	0.979	0.562	0.654	1.387	286	0.991	0.994	0.577	0.560	1.363	0.775
BM_{it}	286	0.646	0.566	0.642	0.280	0.924	286	0.578	0.440	0.658	0.241	0.740	1.243
Explanatory variables:													
$\#RISK_{it}$	0	NA	NA	NA	NA	NA	286	4.091	4.000	1.379	3.000	5.000	NA
$\%RISK_{it}$	0	NA	NA	NA	NA	NA	286	1.342	1.308	0.398	1.021	1.639	NA
MAT_{it}	0	NA	NA	NA	NA	NA	286	0.009	0.005	0.013	0.004	0.009	NA

This table presents summary statistics for variables used in our intertemporal analyses on the usefulness of auditor reporting regime change and the informativeness of risk information disclosed by the auditor. POST=1 if the premium listing company observation is from the post-adoption period, and 0 otherwise. T-statistics report the difference-in-means of the variables between the pre-period and post-period. Our sample encompasses two years before (2011-2012) and after (2013-2014) the new reporting regulation. Variable definitions and measures appear below.
Market liquidity and risk perceptions indicators (measured in $y = t+1$ over six months from July 1st to December 31st to ensure that the annual report is publicly available because according to UK Companies Act 2006 public companies' annual reports should be filed within six months of fiscal year ending on 31st of December) are as follows.
SPREAD = the mean of the relative spread, which is calculated by dividing the difference between the daily ask and bid prices by the average of the daily ask and bid prices; TVOL = the mean daily trading volume divided by the number of outstanding shares; SD = the mean of the volatility (standard deviation) of the daily market returns; DISP = the standard deviation of analysts' EPS forecasts for the firm's currently unreported fiscal year (referred to as "FY1" in IBES terminology) scaled by the absolute value of the mean EPS forecast for the same fiscal year.
Other variables (measured in $y = t$) are as follows.
SIZE = the natural log of market value of equity; BM = book value of equity divided by market value of equity; Float = the percentage of shares that are not closely held; BETA is the coefficient loading on the market excess return in the Fama-French three-factor model; #RISK = the number of risks of material statement disclosed in the audit report; %RISK = the percentage of the number of words indicating risk in the audit report scaled by the total number of words in the audit report, where textual analysis of the audit report is processed using Diction 7 software employing the risk wordlist of Elshandidy and Shrives (2016). MAT = auditor disclosed materiality amount (£) for the financial statements as a whole, scaled by total assets; TVOL, and SD as defined above but measured in $y = t$.
All continuous variables are winsorized at 1% on both tails.

Following Leuz and Verrecchia (2000) and recently Gupta et al. (2018), market liquidity is captured using two proxies: 1- bid-ask spread (SPREAD) = the mean of the relative spread, which is calculated by dividing the difference between the daily ask and bid prices by the average of the daily ask and bid prices; 2- trading volume (TVOL) = the mean daily trading volume divided by the number of shares outstanding. Following Kothari et al. (2009) and recently Ali et al. (2019),

user-perceived risk is captured using two proxies: 1- Volatility (SD) = the mean of the volatility (standard deviation) of the daily market returns; 2- analyst forecast dispersion (DISP) = the standard deviation of analysts' EPS forecasts for the firm's currently unreported fiscal year (referred to as "FY1" in IBES terminology) scaled by the absolute value of the mean EPS forecast for the same fiscal year. Consistent with prior research (e.g., Leuz and Verrecchia, 2000; Campbell et al., 2014; Elshandidiy and Shrives, 2016) market liquidity and risk perceptions indicators are measured in $y = t+1$ over six months (from July 1st to December 31st) to ensure that the annual report, and hence auditor report, is publicly available because according to UK Companies Act 2006 public companies' annual reports should be filed within six months of fiscal year ending on 31st of December.

Consistent with the above-mentioned studies on the firm's market liquidity and risk perceptions, the following control variables are included in our analyses of SPREAD, TVOL, SD, and DISP. SIZE = the natural log of market value of equity; BM = book value of equity divided by market value of equity; Float = the percentage of shares that are not closely held; BETA = the coefficient loading on the market excess return in Fama-French's three-factor model, in addition to TVOL and SD as previously defined. All control variables are measured in $y = t$. Also, all continuous variables are winsorized at 1% on both tails.

The difference-in-means reported in Table 3.6 shows a stability in the control variables with the exception of TVOL and SD. This stability extends to our dependent variables, where we find no significant differences in the means of SPREAD, TVOL, and DISP within the pre- to post-regulatory period. Only the mean of SD is found significantly higher in the post-regulatory period (t-statistic of -3.703 at the 1% level). These stable or insignificant univariate results qualitatively accord with prior research (e.g., Gutierrez et al. 2018; Reid et al., 2015, 2019). The time-related differences in the mean of SD are also consistent with the UK stock market behavior during 2011-2015, where an increase in closing prices is noticeable (Gutierrez et al., 2018). Finally, the expanded audit report content measurements (#RISK, %RISK, and MAT) in the two years following the

new reporting regulation are collectively consistent with those previously obtained for one year after, and by prior studies (e.g., Gutierrez et al. 2018, Reid et al., 2019). That is, our sample descriptive statistics are consistent with prior studies on the expanded audit report and representative of the period in which our study is implemented.

3.6.2.2. Intertemporal results of the new regulatory usefulness and ARD informativeness

As indicated earlier, we examine the usefulness of the new reporting regulation by implementing time-series difference analyses using premium listed companies during the four years surrounding the new reporting regulation. In so doing, we use OLS regressions that control for other factors that prior research on the firm's market liquidity and risk document to be related to SPREAD, TVOL, SD, and DISP (e.g., Leuz and Verrecchia, 2000; Kothari et al., 2009; Gupta et al., 2018). Accordingly, we estimate the following models:

$$SPREAD_{i,t+1} = \gamma_0 + \gamma_1 POST_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 TVOL_{i,t} + \gamma_4 SD_{i,t} + \gamma_5 FLOAT_{i,t} + \varepsilon_{i,t}, \quad (3.5)$$

$$TVOL_{i,t+1} = \gamma_0 + \gamma_1 POST_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 SD_{i,t} + \gamma_4 FLOAT_{i,t} + \varepsilon_{i,t}, \quad (3.6)$$

$$SD_{i,t+1} = \gamma_0 + \gamma_1 POST_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 FLOAT_{i,t} + \gamma_4 BETA_{i,t} + \gamma_5 BM_{i,t} + \varepsilon_{i,t}, \quad (3.7)$$

$$DISP_{i,t+1} = \gamma_0 + \gamma_1 POST_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 BM_{i,t} + \varepsilon_{i,t}, \quad (3.8)$$

where in this pre- to post-regulatory period analyses (i.e., time-series difference analyses for the premium listed companies), $POST_{i,t}$ is our variable of interest. All variables are as previously defined; $POST_{i,t}$ is a dummy indicator that takes one if the fiscal year-end is in the post-regulatory period and zero otherwise.

Similarly, we examine the informativeness of ARD that is provided by the premium listed companies in the two years after the new reporting regulation using the following models:

$$SPREAD_{i,t+1} = \gamma_0 + \gamma_1 \#RISK_{i,t} \text{ or } \%RISK_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 TVOL_{i,t} + \gamma_4 SD_{i,t} + \gamma_5 FLOAT_{i,t} + \varepsilon_{i,t}, \quad (3.9)$$

$$TVOL_{i,t+1} = \gamma_0 + \gamma_1 \#RISK_{i,t} \; or \; \%RISK_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 SD_{i,t} + \gamma_4 FLOAT_{i,t} + \varepsilon_{i,t}, \quad (3.10)$$

$$SD_{i,t+1} = \gamma_0 + \gamma_1 \#RISK_{i,t} \; or \; \%RISK_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 FLOAT_{i,t} + \gamma_4 BETA_{i,t} + \gamma_5 BM_{i,t} + \varepsilon_{i,t}, \quad (3.11)$$

$$DISP_{i,t+1} = \gamma_0 + \gamma_1 \#RISK_{i,t} \; or \; \%RISK_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 BM_{i,t} + \varepsilon_{i,t}, \quad (3.12)$$

where all variables are as previously defined. Here, $\#RISK_{i,t}$ and/or $\%RISK_{i,t}$ are our variables of interest.

These designs are consistent with those used in prior research on the expanded audit report (mainly Reid et al., 2015; Gutierrez et al., 2018; Lennox et al., 2019). That is important to enable clear and reasonable assessment of the usefulness the new reporting regime and the informativeness of ARD beyond that provided by prior research utilizing short-window analysis for investors' reaction.

Table 3.7.
Intertemporal analyses of the usefulness of auditor reporting regime change

	Market liquidity (*y=t+1*)		Risk perceptions (*y=t+1*)	
	(1)	(2)	(3)	(4)
VARIABLES	SPREAD	TVOL	SD	DISP
POST	0.000	0.170*	0.003***	0.049
	(0.191)	(1.662)	(5.667)	(1.483)
SIZE	-0.006***	0.166***	-0.001***	-0.020
	(-6.651)	(3.765)	(-3.338)	(-1.489)
TVOL	-0.000			
	(-0.304)			
SD	0.110	36.967***		
	(0.598)	(3.955)		
Float	-0.000**	0.018***	-0.000	
	(-2.139)	(4.797)	(-0.501)	
BETA			0.001	
			(1.248)	
BM			-0.000	0.212**
			(-0.089)	(2.448)
Industry FE	Yes	Yes	Yes	Yes
Constant	0.130***	-2.205***	0.043***	0.639**
	(5.693)	(-3.192)	(7.041)	(2.295)
Observations	572	572	572	556

Adj. R-squared	0.461	0.209	0.251	0.197

This table reports the coefficient estimates from the OLS estimation to examine whether the new audit report regime is beneficial for complying companies. In Models 1, 2, 3, and 4 we employ time-series difference design for premium listed companies in the pre- and post- new reporting regulatory period. See Table 3.6 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

Consistent with literature on general disclosure (e.g., Leuz and Verrecchia, 2000), we predict a negative (positive) coefficient on $POST_{i,t}$ in our tests of $SPREAD_{i,t+1}$, $(TVOL_{i,t+1})$, $SD_{i,t+1}$, and $DISP_{i,t+1}$ implying more useful information is found by the users of premium listed companies' information in the new reporting regime relative to the period before, that is, an increase (decrease) in firm's market liquidity (risk perceptions). Drawing predictions in line with risk disclosures literature is somewhat complicated. However, since the context of the expanded audit report is relatively similar to that of risk factor disclosures (Item 1A of 10-K), we predict an increase in firm's market liquidity and financial statement users' perceived risk (Campbell et al., 2014). That is, we predict a negative (positive) coefficient on $POST_{i,t}$ in our tests of $SPREAD_{i,t+1}$, $(TVOL_{i,t+1}$, $SD_{i,t+1}$, and $DISP_{i,t+1})$ for the premium listed companies in the pre- to post-regulatory period tests. Moreover, we predict a similar negative (positive) coefficient on $\#RISK_{i,t}$ and/or $\%RISK_{i,t}$ in our tests of $SPREAD_{i,t+1}$, $(TVOL_{i,t+1}$, $SD_{i,t+1}$, and $DISP_{i,t+1})$. This suggests that market participants' risk assessments are expected to result in decrease (increase) in information asymmetry (users' perceived risk) (e.g., Kothari et al., 2009; Kravet and Muslu, 2013; Campbell et al., 2014; Elshandidy and Shrives, 2016).

The time-series difference models 1, 2, 3, and 4 (Eq. 3.5, 3.6, 3.7, and 3.8) of Table 3.7 display the coefficient estimates for premium listed companies in the pre- and post-regulatory period. Models 1 and 4 (Eq. 3.5 and 3.8) show statistically insignificant coefficients on $POST$ indicating that the new reporting regime is not useful in terms of the impact on SPREAD and DISP. However, Models 2 and 3 (Eq. 3.6 and 3.7) show statistically significant coefficients on $POST$ suggesting that the new reporting regime is useful for investors of the premium listed companies. This usefulness is expressed in the form of a decrease in market information asymmetry (i.e.,

increase in market liquidity (TVOL), t-statistic of 1.662 at the 10% level) and an increase in investors' risk perceptions (i.e., volatility of stock returns (SD), t-statistic of 5.667at the 1% level). Our evidence related to TVOL and SD accords with results from prior literature on risk or bad news disclosures (e.g., Kothari et al., 2009; Kravet and Muslu, 2013; Campbell et al., 2014). Here, we are in a good position to verify this non-trivial usefulness for market participants by investigating whether ARD is, in a consistent manner, informative to the users of the premium listed companies.

Table 3.8 reports intertemporal results of the informativeness of ARD (#RISK and/or %RISK). Under models 4, 6, and 8, the coefficient on %RISK is statistically significant in the expected direction (positive) with TVOL (t-statistic of 1.833 at the 10% level), SD (t-statistic of 1.967 at the 10% level), and DISP (t-statistic of 1.755 at the 10% level), respectively. Additionally, under model 5, the coefficient on #RISK is positively statistically significant in terms of SD (t-statistic of 2.149 at the 5% level). The impact on SPREAD, however, remains statistically insignificant. Collectively, these results suggest the informativeness of ARD. The economic significance of these results indicates that, all else being equal, a one-standard-deviation increase in %RISK (0.398; #RISK, 1.379) is associated with about 17%, 0.16% (0.14%), and 4.7% increase in TVOL, SD, and DISP, respectively. These results support our previous evidence regarding the usefulness of the new reporting regime, and, again, are consistent with prior literature on risk disclosure and firm's market liquidity and users' risk perceptions (e.g., Kravet and Muslu, 2013; Campbell et al., 2014). These results are also in line with prior audit research suggesting the negative market reaction to auditor modified opinion, specifically if it is not expected (e.g., Frost, 1997; Taffler et al., 2004; Citron et al., 2008; Menon and Williams, 2010).

Table 3.8.
Intertemporal analyses of the informativeness of auditor risk disclosure

	Market liquidity ($y=t+1$)				Risk perceptions ($y=t+1$)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	SPREAD	SPREAD	TVOL	TVOL	SD	SD	DISP	DISP
#RISK	0.002		-0.006		0.001**		0.023	
	(1.471)		(-0.087)		(2.149)		(1.230)	

%RISK		-0.000		0.427*		0.004*		0.118*
		(-0.057)		(1.833)		(1.967)		(1.755)
SIZE	-0.006***	-0.006***	0.216***	0.194***	-0.002***	-0.001***	-0.036*	-0.034*
	(-5.719)	(-5.861)	(3.762)	(3.325)	(-3.343)	(-3.248)	(-1.765)	(-1.723)
TVOL	-0.001	-0.001						
	(-0.810)	(-0.740)						
SD	0.294	0.382	35.371**	30.004**				
	(0.683)	(0.870)	(2.588)	(2.217)				
Float	-0.000	-0.000	0.018***	0.018***	0.000	0.000		
	(-1.624)	(-1.586)	(3.577)	(3.544)	(0.372)	(0.395)		
BETA					0.001	0.001		
					(1.134)	(0.941)		
BM					0.000	0.000	0.339***	0.322***
					(0.200)	(0.316)	(3.046)	(2.738)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.105***	0.107***	-2.313**	-2.551***	0.042***	0.040***	0.758*	0.674
	(5.864)	(5.464)	(-2.533)	(-2.885)	(7.636)	(7.582)	(1.753)	(1.639)
Observations	286	286	286	286	286	286	278	278
Adj. R-squared	0.525	0.508	0.238	0.250	0.273	0.270	0.264	0.269

This table reports the coefficient estimates from the OLS estimation to examine whether the content of the expanded audit report is informative. Our sample encompasses the premium listed companies in the two years after the new reporting regulation. See Table 3.6 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

3.6.2.3. Market participants' perspective toward auditor disclosed materiality

How do market participants interpret the disclosed materiality? This depends on whether the market sees the disclosed materiality as an indication of firm's risk or audit effort. Livne et al. (2018) link between auditor determined materiality and audit effort. Since the practical concept of materiality represents the level of misstatements that the auditor accepts for the financial statements as a whole without changing the view about the fair presentation of a firm's financial reporting, they employ materiality as a proxy for *depth* of audit effort. Thus, a relatively lower level of disclosed materiality can be seen by the firm's users as a relatively higher effort exerted in the audit and vice versa. Consequently, the market is expected to appreciate a firm with a lower level of disclosed materiality due to the higher credibility it indicates about the audited outputs. Accordingly, if the disclosed materiality (MAT) is meaningful for information users, we would expect an increase in the market information asymmetry (i.e., positive SPREAD, and/or negative TVOL) and risk

perceptions (i.e., positive SD, and/or DISP) for complying firms shown to receive relatively higher materiality (i.e., lower audit effort).[50] Our expectations are, however, reversed if the information users respond to MAT as a signal of firm's risk, i.e., high MAT indicates low risk and vice versa.

Before testing the link between MAT and a firm's market liquidity and users' risk perceptions, following Livne et al. (2018), we check the assumption that MAT indicates audit effort by using OLS regression of MAT on audit fees (AUD_FEES) while controlling for other variables employed in prior research on audit fees (e.g., Choi et al., 2010). Using audit fees to proxy audit effort is common in literature (see Livne et al., 2018 for multiple references). Additionally, consistent with the highly persistent nature of audit fees (Doogar et al., 2015), we run a cross-sectional analysis in the first year (2013) of adopting the expanded audit report. In the meantime, Livne et al. (2018) suggest a possible positive association between the number of risks of material statement and the *breadth* of audit effort. Accordingly, we estimate the following models:

$$AUD\_FEES = \alpha_0 + \alpha_1 MAT, \#RISK, or\ \%RISK + \alpha_2 SIZE + \alpha_3 LEV + \alpha_4 BM + \alpha_5 ROA + \alpha_6 DISTRESS + \alpha_7 BIG4 + \alpha_8 AUD\_LAG + \alpha_9 EMPLOY + \alpha_{10} INVREC + \alpha_{11} CACL + e, \quad (13)$$

where other variables are as previously defined, AUD_FEES = the natural log of audit fees; ROA (return on assets) = net income before extraordinary items divided by total assets; AUD_LAG = audit report lag in days from the fiscal year-end; EMPLOY = the squared root of the number of employees; INVREC = the sum of inventories and accounts receivable scaled by total assets; CACL (current ratio) = current assets divided by current liabilities.

Table 3.9.
OLS regressions of audit fees on auditor risk and materiality disclosures

VARIABLES	AUD_FEES		
	(1)	(2)	(3)
MAT	-10.845**		
	(-2.530)		

[50] Consistent with this view, investors show a concern regarding the possibility that auditors may set a high materiality threshold in order to attract new clients and thus, undermine audit quality (FRC 2013c). This intuitively implies that investors may take the effort exerted in the audit beyond the risk signal that the auditor conveys by MAT.

#RISK		0.086**	
		(2.171)	
%RISK			0.280*
			(1.901)
SIZE	0.532***	0.505***	0.513***
	(13.220)	(12.447)	(12.726)
LEV	0.592*	0.578*	0.699**
	(1.886)	(1.821)	(2.231)
BM	0.353***	0.325***	0.364***
	(3.958)	(3.572)	(4.053)
ROA	-0.963	-1.142*	-1.145*
	(-1.621)	(-1.931)	(-1.929)
DISTRESS	-0.001	-0.110	-0.163
	(-0.004)	(-0.621)	(-0.902)
BIG4	0.258	0.319	0.261
	(1.042)	(1.268)	(1.042)
AUD_LAG	0.006	0.005	0.004
	(1.491)	(1.331)	(0.984)
EMPLOY	0.003***	0.004***	0.004***
	(5.234)	(5.573)	(5.525)
INVREC	0.134	0.065	-0.006
	(0.425)	(0.205)	(-0.019)
CACL	-0.084***	-0.082***	-0.082***
	(-3.291)	(-3.189)	(-3.197)
Constant	5.085***	5.045***	5.065***
	(7.285)	(7.161)	(7.165)
Observations	184	184	184
Adj. R-squared	0.784	0.782	0.780

This table reports the coefficient estimates from the OLS estimation of audit fees on auditor risk and materiality disclosures. Where variables details are given in Table 3.2, AUD_FEES = the natural log of audit fees, ROA (return on assets) = net income before extraordinary items divided by total assets, AUD_LAG = audit report lag in days from the fiscal year-end, EMPLOY = the squared root of the number of employees, INVREC = the sum of inventories and accounts receivable scaled by total assets, CACL (current ratio) = current assets divided by current liabilities. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

The three models exhibited in Table 3.9 suggest an association between the content of the expanded audit report and the burden audit fees (t-statistic and significance level of: MAT = -2.530 at 5%, #RISK = 2.171 at 5%, and %RISK = 1.901 at 10%). Collectively, these results are consistent with that of Livne et al. (2018) and support the association between MAT and ARD and audit effort. This further supports our previous findings related to the sense that ARD has, and gives another possible reason why ARD is of interest to information users (although our previous results

illustrate users' response to risk content rather than audit effort). This finding clarifies the argument that Gutierrez et al. (2018) deduce but are unable to capture, that the extent of audit fees may explain the positive relation between audit effort and auditor discussion of risks. Importantly, the ARD results should not be explained as meaning that the new reporting regime brings higher audit fees for the complying firms, because we did not intend to test this assumption and prior research proves insignificant impact on audit fees (Gutierrez et al., 2018; Reid et al., 2019). As mentioned before, audit fees are highly persistent and thus, the link between the risks of material misstatement and audit fees only becomes observable under the requirement of the new reporting regulation. In addition, the finding provides a rational for testing the possible influence that MAT may have on capital market behavior.

Turning to Table 3.10, the intertemporal results under models 1, 2, and 4 for the premium listed companies in the two years after the new reporting regulation are consistent with our expectations. Specifically, we find a positive (negative) association between MAT and SPREAD, (TVOL), and DISP (t-statistics are 1.830, -1.827, and 1.772 at the 10% level, respectively). The coefficient on SD is also found positive but statistically insignificant. The economic significance of this finding indicates that, all else being equal, a one-standard-deviation increase in MAT variable is associated with about 0.7% (0.013 * 0.553), (-10.9%, 0.013 * -8.386), and 7% (0.013 * 5.369) increase (decrease) in SPREAD, (TVOL), and DISP, respectively. Summing up, our results suggest that the content of the expanded audit report is informative.

Table 3.10.
Intertemporal analyses of the informativeness of auditor disclosed materiality

	Market liquidity ($y=t+1$)		Risk perceptions ($y=t+1$)	
	(1)	(2)	(3)	(4)
VARIABLES	SPREAD	TVOL	SD	DISP
MAT	0.553*	-8.386*	0.099	5.369*
	(1.830)	(-1.827)	(1.096)	(1.772)
SIZE	-0.005***	0.208***	-0.001***	-0.027
	(-6.403)	(3.631)	(-3.111)	(-1.441)
TVOL	-0.000			
	(-0.161)			
SD	0.112	37.982***		

	(0.381)	(2.754)		
Float	-0.000*	0.018***	0.000	
	(-1.970)	(3.587)	(0.534)	
BETA			0.001	
			(1.097)	
BM			0.001	0.366***
			(1.065)	(3.247)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Constant	0.100***	-2.169**	0.038***	0.650
	(5.143)	(-2.381)	(5.758)	(1.486)
Observations	286	286	286	278
Adj. R-squared	0.589	0.243	0.259	0.270

This table reports the coefficient estimates from the OLS estimation to examine whether the materiality threshold that is disclosed in the expanded audit report is informative. Our sample encompasses the premium listed companies in the two years after the new reporting regulation. See Table 3.6 for variable details. T-statistics are clustered at the firm level and reported in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1.

3.6.2.4. Intertemporal change analyses

In order to test our results further, we conduct two intertemporal change examinations. In the first, consistent with prior studies (e.g., Ashbaugh-Skaife et al., 2009; Reid et al., 2015, 2019) we test our results related to the usefulness of the new reporting regime by rerunning Eq. (3.5) to Eq. (3.8) while replacing our firm level analyses by within-firm changes analyses. That is, we employ our dependent and control variables as the change from y = *t-2* to y = *t-1* and from y= *t-1* to y = *t*. Consequently, we replace the POST indicator by ΔPOST, where ΔPOST = 0 for change from y = *t-2* to y = *t-1* and ΔPOST = 1 for change from y = *t-1* to y = *t* (the year of first adoption of the new reporting regulation). In the time-series difference models, our unreported results show that the coefficient on (ΔPOST=0.193) remains positive in the TVOL test (t-statistic of 1.279) with marginally trivial statistical significance. For SD, the coefficient on (ΔPOST= 0.002) retains its statistically positive significance with a t-statistic of 1.980 at the 5% level. Overall, these results support our prior results regarding the usefulness of the new reporting regulation.

Second, following previous risk disclosures studies (e.g., Kravet and Muslu, 2013; Elshandidy and Shrives, 2016), we further test our results related to the expanded audit report informative content (i.e., both ARD and MAT) by rerunning Eq. (3.9) to Eq. (3.12) while replacing #RISK,

%RISK, and MAT by Δ#RISK, Δ%RISK, and ΔMAT, where Δ indicates the differences between a firm's disclosed #RISK, %RISK, and MAT and the median for other firms in the same industry over two years after the new reporting regulation. Collectively, our unreported results are found consistent with those previously obtained from Tables 3.6 and 3.9. In sum, the intertemporal change findings provide additional evidence on the strong cause-effect relationship between our explanatory and dependent variables and thus, our results' robustness.

3.7. Conclusion

Among other auditing standards applicable in many jurisdictions, the revised ISA 700 (UK and Ireland) was introduced in 2013 and mandated the expanded audit report. It requires the independent auditor to disclose the risks of material misstatement with the greatest effect on the audit, the application of materiality, and the scope of the audit. The fundamental premise underlying the new audit reporting standard is to improve the capital market environment for the complying firms (LSE premium listed companies). Employing this unique setting, we use several cross-sectional and intertemporal tests to explore two main research questions: 1- whether the expanded auditor's report is not generic and thus, the new audit report regime may yield benefits to complying firms through lower information risk that translates into lower cost of equity, and 2- whether the reporting regulation change and information content of the expanded audit report affect information asymmetry and risk perceptions.

In the cross-sectional tests, we find that firms receiving an expanded audit report with a higher level of risk disclosure exhibit significantly higher beta and cost of equity. Furthermore, we find significantly negative association between auditor disclosed materiality (that is negatively related to the assessed and identified risks of material misstatement) and idiosyncratic risk, beta, and cost of equity. These findings suggest that expanded auditor's disclosure is not generic, rather associated with the information risk that a firm presents to investors. Therefore, firms complying with the new reporting rule, which have relatively more reliable financial reporting, i.e., have

relatively low risks of material misstatement inducing the auditor to specify a high level of materiality, can benefit from a lower information risk and a lower cost of capital.

We use intertemporal tests, where we structure time-series difference and standard post-regulatory panel designs, to investigate the economic usefulness of the audit report regime change, and the information content of expanded auditor's disclosure. The evidence we find suggests that the new reporting regime is, on average, related to higher market liquidity (trading volume) and investors' perceived risk (volatility of market returns). Particularly, the intertemporal results of the informativeness of the expanded audit disclosures show that a high level of ARD positively and significantly impacts the trading volume, volatility of market returns, and analyst forecast dispersion. Consistent with the argument that auditor determined materiality is negatively related to audit effort (Livne et al., 2018), our intertemporal results further indicate that market participants appreciate the firm with a lower level of disclosed materiality due to the higher credibility it indicates about the audited outputs. Specifically, we find a significantly positive (negative) impact of the determined materiality threshold (i.e., low audit effort) on bid-ask spread, (trading volume), and analyst forecast dispersion.

Collectively, our cross-sectional and intertemporal tests, which control for other factors that previous studies show to be related to the above-mentioned measures, as well as endogeneity concern, provide direct evidence that the expanded auditor reporting is firm-specific and useful for financial statement users. This also is consistent with the notion that the expanded auditor's report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants. Our results complement prior experimental studies and archival research on the effect of the expanded auditor's report and its content on the investors' reaction. This, in turn, is supportive of the FRC decision to go beyond the traditional standardized pass/fail audit opinion on the financial statements and helps to relieve related concerns that PCAOB has recently expressed.

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Appendices of Chapter 3

Appendix 3.A.
Elshandidy and Shrives' (2016) risk wordlist

risk*, loss*, decline*, decrease*, less, low*, fail*, threat, reverse*, against, catastrophe*, shortage, unable, challenge*, uncertain*, gain*, chance*, chances, increase*, peak*, high*, fluctuate*, differ*,diversify*, probable*, possible, significant*, against, subject, affect*, potential*, depend*, expose*, hedge*, vary*, likely, might, influence*, susceptible, viable

Note, the symbol * refers to including derivatives of the original word.

Chapter 4. Internal control effectiveness, textual risk disclosure, and their usefulness: US evidence

4.1. Introduction

Previous research (e.g., Ashbaugh-Skaife et al., 2008; Schneider et al., 2009; Iliev, 2010; Clinton et al., 2014) indicates that an apparent void in the SOX and internal control literature relates to the benefits of Section 404 (b) (that obligates the external auditor of the accelerated filers to report on the effectiveness of internal control over financial reporting) in improving the reliability of financial reporting and ultimately whether this regulation is useful to the market.[51] Meanwhile, knowing whether internal control effectiveness drives firms to efficiently disclose their risks externally, an important component for reliable information (AICPA, 1987; SEC, 2003a; PCAOB, 2004), is still unexplored (Elshandidy et al., 2018).[52] Additionally, exploring the usefulness of conveying such internal knowledge (i.e., textual risk disclosure (TRD) and SOX 404 (b) reporting) to the market are not conclusive (e.g., Schneider et al., 2009; Gupta et al., 2018; Elshandidy et al., 2018). To address this issue, we raise two research questions. First, whether the internal control effectiveness (ICE) influences *TRD*. Second, whether ICE attestation by the external auditor and management's TRD are useful to the market.

According to PCAOB (2004) Auditing Standard No. 2 (AS2), internal control material weaknesses (ICW) are considered the most severe form of internal control deficiencies (ICD) as compared to significant deficiencies and control deficiencies. An ICW implies that there is an information problem in the firm's detecting and reporting system and is an indicator that the firm has ineffective internal controls (i.e., low quality) and thus, results in less reliable information

[51] Accelerated filers are the issuers that have a public float of at least $75 million as of six months before fiscal year-end (SEC, 2005).

[52] On average, 80% of a typical annual report consists of textual disclosures with a great focus on risk-related information that is intrinsically crucial to grasp and interpret the numbers and representations of quantitative data (Kravet and Muslu, 2013; Dyer et al., 2017; Lo et al., 2017). Words used by managers to describe their operations are also found to be correlated with management activities, as well as stock returns and earnings (Loughran and McDonald, 2016). Thus, this chapter sets out to investigate the level of textual risk disclosure as set out below.

(Ashbaugh-Skaife et al., 2009; Feng et al., 2009; Cheng et al., 2013).[53] Theoretical (e.g., Lambert et al., 2007) and empirical (e.g., Leuz and Verrecchia, 2000; Kothari et al., 2009a; Ashbaugh-Skaife et al., 2009) literature on general disclosure suggests that the quality of a firm's information systems, including the effectiveness of internal control over financial reporting, affects information asymmetry and risk components of the firm's cost of capital by the increase in the imparted disclosure. Prior TRD literature widely concerns two aspect: exploring the underlying drivers of risk disclosure and/or studying the usefulness of such disclosure (for a recent review see, Elshandidy et al., 2018). Literature, however, leaves a considerable gap around the incentives of TRD because TRD remains largely voluntary, despite the severity of regulations on risk disclosure, due to subjectivity in assessing firms' risks and uncertainties (e.g., SEC, 1997, 2010; Hope et al., 2016), and the informativeness of such disclosure is substantially unknown (Kravet and Muslu, 2013).[54] Consistent with this premise, we examine the relationship between ICE (as a driver or an incentive) and the level of TRD (where aggregate risk disclosure and the tone in risk news are considered), and the benefit of those two types of internal information that are carried to the market by the external auditor and management as follows.

Broadly, SOX 404 requires management to establish and maintain an effective internal control system to significantly and positively reveal the firm's unknown and inherent risk factors and uncertainties that affect internal management reports and, thus, decisions based on these reports so as to ensure the reliability of financial reporting (SEC, 2003b; Feng et al., 2009). Consistent with PCAOB (2004, 2007), prior research (e.g., Doyle et al., 2007a; Ashbaugh-Skaife et al., 2008, 2009; Donelson et al., 2017) posits that when there is an ICW, there is more than a remote likelihood that the internal control system is ineffective in detecting and disclosing risk factors and

[53] Consistent with prior research (e.g., Donelson et al., 2017), we use ICW reported by the external auditor under SOX 404 (b) as it ensures credible and rigorous evaluation of internal control and, thus, to grant a greater power to our analyses. Additional details regarding ICW reported under SOX 404 (b) are provided in Section 4.4.1.

[54] This accords with the theoretical argument in which Dobler (2008) calls for exploration of risk disclosure incentives in the highly regulated countries, and empirical evidence derived from prior risk disclosure research in highly regulated jurisdictions such as Finland (Miihkinen, 2013), Germany (Elshandidy and Shrives, 2016) and the US (Campbell et al., 2014).

contingencies on a timely basis. Consistent with this conjecture, we hypothesize that an effective internal control system reveals more risk factors and contingencies, and thereby enhances managers' ability to disclose a higher level of risk information.

Signaling theory underpins managers' rational motives to disclose their firms' risks. That is, the high level of TRD is employed as a signal of the effectiveness in identifying, measuring, and managing risk (e.g., Elshandidy and Shrives, 2016). Nevertheless, the above nexus may fail to completely observe the probable impact of ICE (proxied by ICW, so throughout the chapter, both are used interchangeably) on TRD because of managers' tendency to withhold bad news about risk (Linsley and Shrives, 2006; Kothari et al., 2009b). Therefore, in our further analyses, we test whether mangers would respond to the external auditor public report on their firms' ICW. If managers respond, we expect mainly to observe a significant increase in disclosing bad news about risk because it becomes costly or difficult for managers to delay releasing bad news about risk after receiving an external auditor's adverse opinion on their firm's internal controls (Skinner, 1994; Bao et al., 2019).[55]

Specifically, consistent with prior literature (e.g., Deumes and Knechel, 2008; Beneish et al., 2008; Feng et al., 2009; Cheng et al., 2013), we expect managers of firms reporting *recurrent* ineffective internal controls to be the most likely to change their TRD behavior (i.e., moving from a relatively lower to relatively higher level of TRD) for two possible reasons. First, these managers would become aware from the external auditor about their firms' internal control risks. Second, since an external auditor's adverse opinion on a firm's internal controls (i.e., ICW exists) entails an adverse public signal, managers are expected to positively address this problem by providing more disclosure to guide their firms' stakeholders. Consequently, pursuant to agency theory, an increased level of TRD (particularly, bad news about risk) can be observed in firms associated with recurrent ineffective internal controls as a *response from managers* (*rather than the effectiveness of internal control system*)

[55] For more discussion about the reasons why managers may disclose or withhold bad news, refer to Skinner (1994) and Kothari et al. (2009b). Bao et al. (2019) provide recent and novel evidence in this respect.

to the expected increased uncertainty level that results from the ICW identified and publicly reported by the external auditor so as to reduce the public uncertainty and agency problems.

Analyzing investor assessment of this internal knowledge conveyed to the market is crucial to investigate if it is useful (Leuz and Verrecchia, 2000; Kothari et al., 2009a). This further is encouraged since the possible linkages between SOX 404 (b) and market assessment have failed to be evidenced (e.g., Dowdell et al., 2013; Gupta et al., 2018), and, as noted earlier, the debate about the usefulness of TRD (e.g., Elshandidy and Shrives, 2016). Our chapter adds to internal control literature and US research (see Schneider et al., 2009 and Elshandidy et al., 2018) concerning the benefit of internal control and risk information provided under SEC requirements (e.g., SEC, 1997, 2005) by providing combined evidence about the usefulness of both ICW reporting and TRD. More specifically, we argue that the aggregate level of risk disclosure and its good news, bad news, or net tone would alleviate (intensify) information asymmetry and investor-perceived risk and, thereby, reduce (increase) the expected negative market assessment due to an external auditor's ICW reporting. There is no empirical study, to the best of our knowledge, on testing the market assessment of TRD by management and ICW reporting by the external auditor (in addition to their interaction). Our chapter also answers the calls by Schneider et al. (2009) and Gupta et al. (2018) for additional research on the market assessment of ICW reported by accelerated filers under SOX 404 (b). Figure 1 portrays the research design.

Our findings suggest that firms with an ineffective internal control system exhibit significantly lower levels of aggregate risk disclosure and its tone relative to firms with an effective internal control system. In our further analysis, we also document that the recurrently identified and publicly reported ICW prompts managers to significantly change their TRD behaviour by providing higher levels of aggregate risk disclosure and its tone relative to other firms. In terms of the informativeness of ICW reporting and TRD, we find that ICW reporting leads to a significant and positive increase in market illiquidity (proxied by bid-ask spread and Amihud's (2002) illiquidity ratio) for ICW firms that have the nearest observable characteristics to non-ICW firms.

Additionally, results show that ICW reporting leads to a significant and positive increase in investor-perceived risk (proxied by volatility of market returns) when there are intertemporal changes in the effectiveness of internal controls, and/or when it is accompanied by a change in firms' TRD relative to their industry norm.

While our finding suggests that TRD is apparently statistically insignificant in terms of investor-perceived risk, it shows that the level of aggregate risk disclosure negatively and significantly impacts the information asymmetry by reducing the bid-ask spread. In contrast, a high level of aggregate risk disclosure would result in a significant decrease in market liquidity (i.e., higher illiquidity ratio) in firms that receive ICW reporting and have the nearest observable characteristics to non-ICW firms. When we distinguish the tone of the aggregate risk disclosure, results show that while bad news about risk implies trivial interest from the market participants, good news and net tone about risk entail a significant positive market liquidity (lower bid-ask spread and illiquidity ratio).

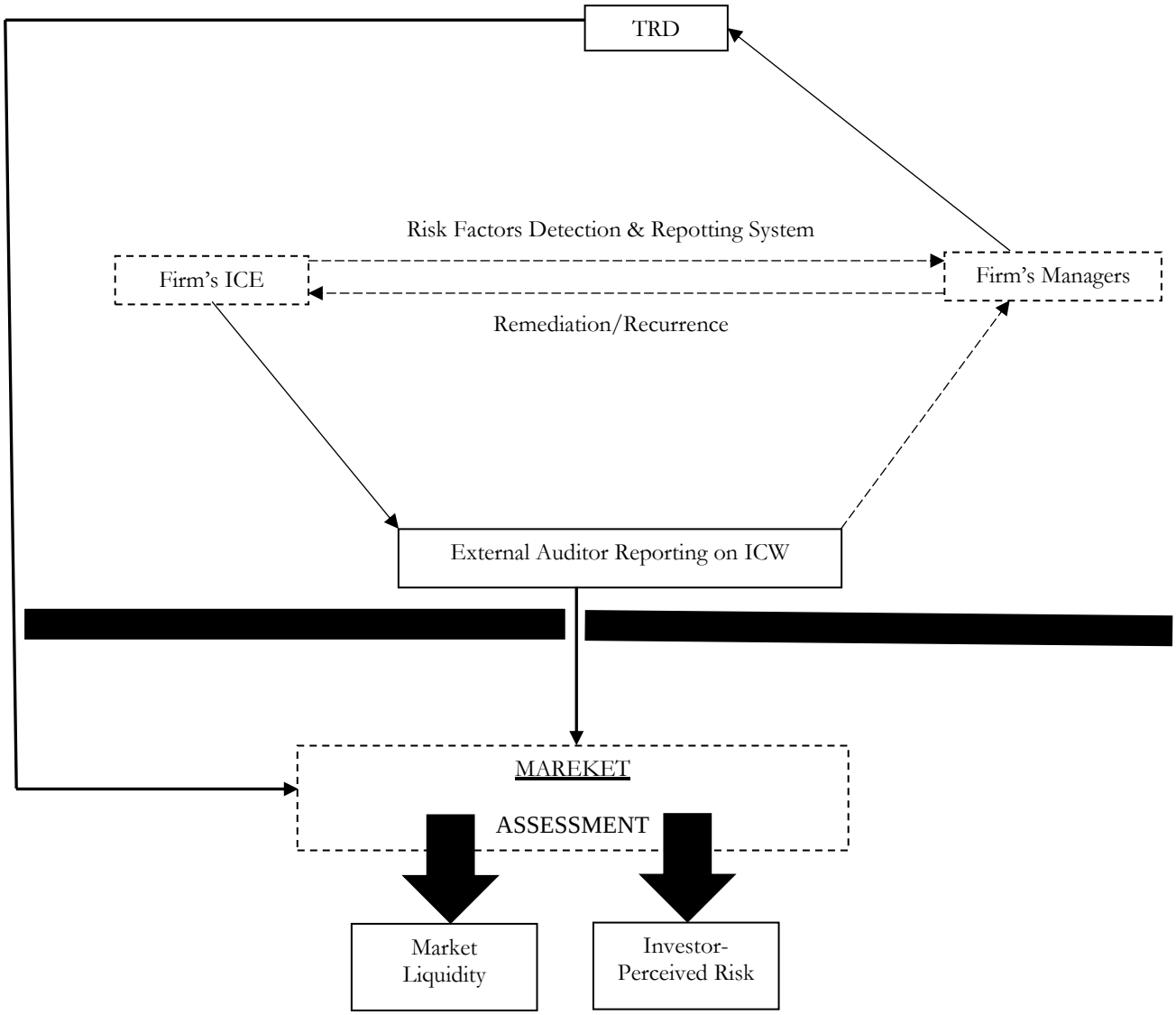
The interaction results suggest that investors would rely on the meaningful information conveyed by TRD to revise their judgment on ICW reporting, particularly when ICW firms have the nearest observable characteristics to non-ICW firms. Specifically, our evidence suggests that investors negatively assess the conflict between the credible ICW reporting by the external auditor and management tone about risk (i.e., good news and net tone about risk). On the contrary, consistent with agency theory, managers can reduce information asymmetries around the ICW reported by the external auditor through providing greater amount of aggregate risk disclosure and its tone of bad news about the risk so that indicate their realization of their firms' risks.

We further show that ICW reporting, aggregate risk disclosure and bad news about risk (good news and net tone about risk) positively (negatively) affect investors' reaction around the 10-K filing, and, as expected, this effect is decreased for firms with a rich communication environment. Collectively, results from our analysis of the events subsequent to and around the 10-Ks release

suggest the usefulness of the external auditor's attestation on the firm's internal controls and management TRD.

Figure 4.1. Research design

RQ1: whether the internal control effectiveness (ICE) influences textual risk disclosure (TRD)?



RQ2: whether external auditor's opinion under SOX 404 (b) and management's TRD are useful to the market?

This figure illustrates the relationship between factors and variables associated with the study's first research question (as exhibited above the horizontal solid line) and the second research question (as exhibited below the horizontal solid line). Solid boxes show the observable variables and thus, solid arrows present the direct/observable relations that are the main interest of our study.
Dashed boxes show unobservable bodies and variables and thus, dashed arrows present the indirect/unobservable relations that our study infers.

Our findings have several theoretical and practical implications. First, they suggest that ICW affects not only the accuracy and quality of information used by managers and disclosed to

investors (as established in previous studies, see for example Feng et al. (2009) and Ashbaugh-Skaife et al. (2008)) but also the *quantity* of (risk) information. This, in turn, suggests that internal control effectiveness has broader implications than those previously documented in the literature and provides further support in favor of the benefit of SOX 404 (b) in improving the financial reporting reliability. Second, the ways in which the internal control system or external auditor's opinion under SOX 404 (b) may help or prompt managers to increase their level of TRD and the impact of these different types of internal information on the market should also be of particular interest to regulators (e.g., AICPA; SEC; PCAOB) when assessing the related regulations. Third, our results extend the evidence provided by Clinton et al. (2014) regarding the negative implications of ICW presence and reporting for financial analysts and provide external validity and generalization to the experimental evidence on the informativeness of ICW reporting (Lopez et al., 2009; Church & Schneider, 2016). Fourth, the results also manifest the importance of identifying the tone of disclosure in general (Kothari et al., 2009a), and particularly aggregate risk disclosure (Elshandidy and Shrives, 2016) to reach an insightful understanding of the drivers for and usefulness of TRD. Fifth, the evidence stems from our textual analysis draws investors' intention toward the reliability and usefulness of information conveyed by the 10-K narratives.

The insights provided by our chapter contribute to both internal control and risk disclosure literature. We add to the prior research (e.g., Dobler, 2008; Campbell et al., 2014) calling for the investigation of risk disclosure incentives by hypothesizing that the nexus between ICE and the level of TRD is two-fold, where the first is associated with the role of *an effective internal control system* in risk revelation and the second with *the change in managers' risk disclosure behavior* as a response to the identification and publicly reporting of ineffective internal controls. This rationalizes the debate around the importance of SOX 404 (b) reports by accelerated filers in improving financial reporting reliability. We also contribute to the ongoing debate between academics (e.g., Gupta et al., 2018; Elshandidy et al., 2018) and regulators (e.g., SEC, 2009) about the usefulness of both narrative-

related disclosures (focusing on risk) and SOX 404 (b) by investigating their informativeness to market participants and how TRD would reshape market assessment around ICW reporting.

The remainder of the chapter is organized as follows. Section 4.2. discusses the theoretical considerations. Section 4.3. reviews related literature and develops the hypotheses. Section 4.4. describes the methodology and data. Section 4.5. discusses the empirical results, and provides further and robustness tests. Section 4.6. concludes, states limitations and suggests avenues for future research.

4.2. Theory

Agency theory underpins that it is important to control managers' behavior through monitoring, e.g., employing accounting and auditing mechanisms, to reduce agency conflicts (Jensen and Meckling 1976; Watts and Zimmerman 1986). Accordingly, managers are motivated to expand resources on monitoring to alleviate the agency problems and thus, reduce investors' claims on the firm (Deumes and Knech, 2008). In this, the effectiveness of internal controls can serve as a monitoring mechanism to reduce agency conflicts, since it provides managers with more reliable information for the sake of financial reporting (COSO 1992; DeFond 1992; Keasey and Wright 1993; Anderson et al. 1993). Specifically, internal control is an effective tool to detect and report unintentional errors, employee wrongdoing, unknown and inherent risk factors and uncertainties that affect internal management reports and, thus, decisions based on these reports so as to ensure the reliability of financial reporting (SEC, 2003b; Hay and Knechel 2005; Deumes and Knech, 2008; Feng et al., 2009; Kravet and Muslu, 2013).

In addition, the external auditor's reporting on ICE would affect information asymmetry and investors' risk perceptions as follows (Deumes and Knech, 2008). Since the within-firm internal control activities are unobservable by investors, they are unable to grasp the nature, extent, and quality of internal controls. Consequently, the external auditor's reporting on ICE would enable investors to observe managers' procedures to detect and manage risks or their efforts to provide

reliable information by maintaining effective internal controls. That is, reporting on ICE can reduce agency problems that would arise from managers' possession of superior knowledge about internal control. Moreover, due to the credibility of the external auditor's reporting on ICE, and to the extent that this reporting reassures investors about the financial reporting reliability, such reporting may affect information asymmetry and investors' risk perceptions.

Managers' incentives to disclose on their firms' risks and the usefulness of such disclosure can also be conceptualized by the agency and signaling theories (Jensen and Meckling, 1976; Akerlof, 1970; Spence, 1973). Managers are motivated to provide a higher level of risk information to reduce agency costs by reducing information asymmetry. Besides, managers may disclose their firms' risk exposure to signal to the market their ability and quality in detecting, measuring, and managing risk. Therefore, managers can employ risk disclosure to distinguish their firms from others that may be perceived as less effective in risk management (e.g., Elshandidy et al., 2013; Elshandidy and Shrives; Elamer et al., 2020).

In summary, this chapter draws insights from the agency and signaling theories to explain the importance of attaining an effective internal control system that serves as a monitoring mechanism. In addition, the premises of these theories indicate the usefulness of ICE reporting by the external auditor and TRD by management. This usefulness can be observed in terms of reducing conflicts between agency parties, signaling the quality, reducing investors' uncertainties and risk perceptions about the amount and time of future cash flows.

4.3. Literature Review and Hypothesis Development

4.3.1. The effectiveness of internal controls and textual risk disclosure

According to AS2, internal control over financial reporting is a process designed by the company's principal executive and officers so as to ensure the reliability of financial reporting for external purposes in accordance with generally accepted accounting principles. Empirical research (e.g., Doyle et al., 2007a; Costello and Wittenberg-Moerman; 2011; Cheng et al., 2013) indicates

that financial reporting reliability is driven by (is function of) the firm's ICE. The effectiveness of a firm's internal controls is determined through, among others, risk assessments and information and communication (Ashbaugh-Skaife et al., 2009). Consequently, an ineffective internal control system (i.e., where ICW exists) is likely to adversely affect the ability of managers or their employees, in the normal course of performance, to detect and report risk factors and contingencies on a timely basis (Doyle et al., 2007a; Ashbaugh-Skaife et al., 2009; Feng et al., 2009).

Consistent with signaling theory, managers are motivated to provide a high level of risk information regarding how they effectively identify and manage their risks in order to distinguish their firms from other firms that do not manage risks or do so less effectively (Elshandidy and Shrives, 2016). In addition, providing a high level of risk information is a key mechanism managers use to establish or change investors' risk expectations, reduce litigation risk, and improve the firm's reputation for transparent and credible disclosure (Feng et al., 2009). Therefore, managers of firms with effective internal controls would be more capable and willing to disclose more TRD. Furthermore, prior research (e.g., Lisic et al., 2016) indicates that managers are more able to misappropriate company assets, extract rents from shareholders (e.g., engage in insider trading, see Skaife et al., 2013), and have discretion over financial reporting due to the lack of formal policies and procedures where internal controls are ineffective. Thus, when internal controls are weak, managers are expected to provide a lower level of risk information.

Prior research that addressed the relationship between the firm's internal control and information reliability other than risk disclosure indicates a positive association between ICE and the accuracy and quality of disclosed information (e.g., Doyle et al., 2007a; Ashbaugh-Skaife et al., 2008; Chan et al., 2008; Feng et al., 2009). Previous studies also suggest various negative implications of a firm's ICW for its financial reporting. Donelson et al. (2017) evidence a strong association between ICW and managers committing fraud, as well as signaling false integrity and reporting quality. Chen et al. (2017) find that the adverse effects of top managers' information disadvantage relative to divisional managers on voluntary earnings forecasts and restatements are

more severe in the presence of ICW. Examining the relationship between financial reporting quality and investment efficiency, Cheng et al. (2013) reveal that firms that report ICW show inefficient investment before the disclosure and this investment inefficiency is mitigated or eliminated in the period following the disclosure due to rectifying the problems in the internal control system.

This discussion suggests that effectiveness of internal control over financial reporting is likely to have a causal association with firms' efficiency in revealing and disclosing more risk factors and contingencies and thus, increases managers' ability to disclose a high level of TRD. Alternatively, an ICW implies an information problem in the firm's financial reporting system that results in inefficiency in risk detection and reporting. Therefore, we formulate the following directional hypothesis:

H1: *Ceteris paribus*, firms with an effective internal control system tend to exhibit a significantly higher level of TRD relative to firms with an ineffective internal control system.

4.3.2. The informativeness of the internal control reporting and textual risk disclosure

Predicating on Lambert et al.'s (2007) theoretical framework, Ashbaugh-Skaife et al. (2009) posit (and find) that the indirect real effect of a firm's ineffective internal control over financial reporting translates into investors' negative assessments of firm risk. Ashbaugh-Skaife et al. (2009) also suggest that market participants' assessments of a firm's accounting signals are impaired when ICW is present. In line with that, Costello and Wittenberg-Moerman (2011) find that lenders see financial information is less valuable when a borrower's financial statements are subject to ICW, and as a result, move toward credit-rating-based provisions. According to agency theory, firms can reduce information asymmetries either between the firm and market participants or between informed and non-informed investors, as well as the arisen uncertainties by providing a higher amount and quality of information (e.g., Beyer et al., 2010). Thus, in the US secondary loan market, El-Mahdy and Park (2014) conclude that loan-specific characteristics help to mitigate the market's negative assessment of the disclosed ICD because of reducing information asymmetry.

Similarly, in the capital market, when an external auditor adversely attests on a firm's internal controls, which would result in a deterioration in the value of accounting information provided to the public, investors are expected to search for an alternate source of information, such as textual disclosures, to assess firm risk. Managers would also employ their narrative sections to reduce the market's asymmetric information, uncertainty and thus, the expected negative assessment (Lev, 1988; Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000).

Consistent with this notion, previous studies on the link between market reaction and assessment of ICD reporting document a higher cost of equity (Ashbaugh-Skaife et al., 2009), negative stock price reactions (Beneish et al., 2008; Hammersley et al., 2008) and lower market liquidity (El-Mahdy and Park, 2014; Dowdell et al., 2013; Gupta et al., 2018).[56] In line with Bertomeu et al.'s (2011) theoretical argument that disclosing more information can decrease information asymmetry, *inter alia*, where there is an overlap in the information obtained by managers and investors (as in the situation where ICW is reported), Beneish et al. (2008) suggest that investors' response, in terms of the abnormal returns and equity cost of capital, to an ICW report depends on recognizing the uncertainty information disclosed by firms. Further, Kim and Park (2009) suggest that a firm's voluntary disclosure that reduces market uncertainty can mitigate the adverse influence of ICD reporting.

In relation to informativeness, prior risk disclosure research (e.g., Hope et al., 2016; Akhigbe and Martin, 2008) suggests that risk information matters to the market. Consistent with Kravet and Muslu (2013), Campbell et al. (2014) find that a higher level of risk disclosure raises the market's assessments of a firm's risk, or so-called investors' risk perceptions. Simultaneously, Campbell et al. (2014) conclude that this heightened level of risk disclosure reduces information asymmetry (e.g., bid-ask spread) among that same firm's investors. This conclusion accords with the argument of Kravet and Muslu (2013) that risk disclosure is likely to reduce the investors' perceived risk (e.g.,

[56] Notably, attempts made by previous studies (e.g., Dowdell et al., 2013; Gupta et al., 2018) toward market assessment of the most severe type of ICD (i.e., ICW) were either insignificant or inconsistent and left an unclear understanding of the impact of SOX 404 (b) reporting on the market.

volatility of stock returns) if it is expected and related to known risk factors (which would be relevant where ICW is reported). More specifically, Elshandidy and Shrives (2016) find that the tone of risk disclosure is directionally associated with the market's assessment, where good, compared to bad, news about risk is found to mitigate information asymmetry and decrease investors' risk perceptions, and *vice versa*.

This discussion indicates that ICW reporting is expected to increase information asymmetry and investor-perceived risk, and the accompanying TRD is likely to reduce (increase) this negative perception by market participants through mitigating (intensifying) the market's asymmetric information. It is worth noting that studying the behavior of information asymmetries and risk perceptions all together is somewhat tricky because, fundamentally, a high level of disclosures is likely to reduce (increase) investors' information asymmetry (risk perceptions). In the same vein, during the time of high-risk perceptions, market liquidity would worsen because uninformed investors would protect their investment by raising prices against informed investors (e.g., Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000). Additionally, interpreting market liquidity and perceived risk can be comparatively complicated because their proxies may extend to related topics such as investors' opinion divergence (e.g., Garfinkel, 2009). Nevertheless, our interest focuses on whether ICW reporting and TRD are informative to the market participants, and further if TRD benefits investors in judging a firm's risk around auditor ICW reporting.[57] This, therefore, leads to the following unidirectional hypothesis:

H2: *Ceteris paribus*, the level of TRD is informative and likely to mitigate (or strengthen) the market's expected negative assessment of an ICW report.

[57] Qualitatively, our approach is consistent with prior TRD research (e.g., Kravet and Muslu, 2013; Campbell et al., 2014; Elshandidy and Shrives, 2016) and internal control studies (El-Mahdy and Park, 2014; Dowdell et al., 2013; Gupta et al., 2018) that concern examining informativeness.

4.4. Research Design

4.4.1. Sample selection and data collection

Our sample compiles data related to 10-K filings of listed firms on the SEC EDGAR database for fiscal years 2004-2006 ending on December 31 (reasons are given below). We require sample firms to have a SOX 404 (b) auditor opinion available on Compustat (i.e., our sample contains accelerated filers), and no missing data from Compustat, Datastream, and CRSP databases. Various identifiers, involving CIK of the Edgar filings and the prementioned databases' codes such as TICKER, GVKEY and PERMNO, are used to merge our data. We exclude 1,669 firm-years with Compustat equity market capitalization less than $75 million (or missing) at the fiscal year ends in order to keep the accelerated filers and minimize the possibility that a firm no longer exists.[58] We also exclude 5,939 firm-years of foreign firms because they were not subject to SOX 404 until July 15, 2006 (July 15, 2007, for foreign firms with a public float of under $700 million) and 8042 firm-years of financial firms (SIC 6000-6999) because of their distinct regulations and accounting practices (Chan et al., 2008; Iliev, 2010).

Our sample retains only firms with a fiscal year end on December 31 to synchronize the time period of firms with ICW and without ICW, as well as exploring the impact of internal control and risk information on the market assessment in a precise and timely fashion (e.g., Chan et al., 2008; Ashbaugh-Skaife et al., 2009; Elshandidiy and Shrives, 2016). Our final sample is composed of 3,043 firm-year observations, 222 of which have ineffective internal controls (i.e., at least one ICW exists at year-end). The number of observations decreases for the within-firm change analysis (1,937 firm-years) because this test requires data on the difference between successive years. Sample construction is outlined in Panel A of Table 4.1.

[58] Following prior research (e.g., Ashbaugh-Skaife et al., 2008; Chan et al., 2008; Iliev, 2010; El-Mahdy and Park, 2014), we define accelerated filers by initially employing market capitalization as a proxy for public float because they are very similar for most firms (see footnote 50). Then, we manually assure that our final sample is comprised of accelerated filers.

In our analysis, consistent with prior research (e.g., Feng et al., 2009; Donelson et al., 2017; Clinton et al., 2014), we depend on ICW reported by the external auditor under SOX 404 (b) instead of that disclosed by management under SOX 404 (a) and SOX 302 because the latter is more ambiguous and less rigorous. Additionally, previous studies (Schneider et al., 2009) indicate that the external auditor, rather than management, is more effective in detecting and publicly disclosing ICW. For example, Donelson et al. (2017) suggest that using external auditor's opinion as opposed to management disclosure is more accurate, especially if managers are fraudulent. Consequently, we consider that the internal control system is ineffective if the external auditor's opinion is adverse (i.e., there is ICW), while it is considered as effective if the auditor's opinion is clean.[59]

December 2004 is the starting point of our sample because SOX is effective for accelerated filers for fiscal years ending on or after November 15, 2004. By extending our sample to December 2006, we override the criticisms of using a sample period limited to the first year of SOX 404 for studying the benefits of ICE and the impact on market assessment.[60] We use this longer time period sample to establish intertemporal analyses for the association between ICW and TRD, as well as the impact of ICW reporting and TRD on market assessment, to test their usefulness. We end our sample in December 2006 for two main reasons. First, to avoid measurement error endogeneity bias results from the application of AS5 (which is related to a significant decline in the accuracy of identifying and reporting of existing ICW; see, SEC (2009); Rice and Weber (2012); Chasan (2013); PCAOB (2013); Schroeder and Shepardson (2016)) and the financial crisis in 2007 (e.g., Dedman, 2016). Second, to avoid results bias due to the less or no variability of ICW reporting because prior studies (Feng et al., 2009; Dowdell et al., 2013; Schroeder and Shepardson, 2016) indicate that the

[59] It is worth noting that under AS2, representing our sample period, the external auditor was required to issue two separate reports on the financial statements and the internal controls over the financial reporting system. This, among other changes, was changed under AS5 (superseding AS2) which allows the auditor to issue a combined report for fiscal years ending on or after November 15, 2007.

[60] Critics argue that significant transition difficulties make it less well suitable to identify cross-sectional variation in ICE in the first year of SOX 404, and, thus, contemporaneous audited reporting measures are not ideal to identify ICE enhancements (Schroeder and Shepardson, 2016).

proportion of firms reporting ineffective internal control decreases significantly over time, especially from the application of AS5 in 2007 onwards. For a sample period from 2004 to 2013, Chen et al. (2016, p. 15) are compelled to delete 14,326 observations from their main sample of 18,593 firm-year observations, leading to a final sample of 4,267 firm-year observations (which is roughly similar to our final sample), "*because these firms do not exhibit variation in the ICW variable during the sample period.*"[61] Obviously, like prior research (e.g., Rose-Green et al., 2011), we are not testing an old setting, rather employ the most appropriate setting for our study.

4.4.2. Textual risk disclosure analysis[62]

The clean textual content of our sample 10-K filings, after eliminating HTML, ASCII-encoded graphics, and tables, is used because we focus on the narrative sections. Dyer et al. (2017) document that textual disclosure on both risk factors and internal control is not confined to a single section of the 10-K but spreads and interweaves across all the sections. Thus, employing TRD analysis that encompasses the entire 10-K is reasonable and consistent with our study's purpose.[63] In order to capture the TRD in the 10-K narratives, we employ Elshandidy and Shrives' (2016) complete risk wordlist, which is consistent with that of Kravet and Muslu (2013), as both relied on searching the entire sections of annual reports or 10-K fillings. Following Elshandidy and Shrives (2016), we classify the aggregate risk words in terms of tone into good or bad news about risk. After excluding neutral words that reflect neither the up nor the downside (e.g., significant, probable, and differ) from aggregate risk words, a word that reflects the positive side of the risk, i.e., potential gains and opportunities, is classified as good news about risk, while a word that reflects the negative side of the risk, i.e., potential losses/threats, is classified as bad news about

[61] Attempting to address these limitations on ICW as proxy for ICE, Buslepp et al. (2019) suggest the misclassification of audit-related fees as an alternative proxy for ICE. This proxy is, however, limited to the M&A setting and developed using the unaudited disclosures of management.

[62] We acknowledge Bill McDonald for providing access to his data repository.

[63] That is, drawing investors' attention toward the fact that TRD embraces a wider spectrum of risk factors (e.g., operational and legal risks) relative to the risk of ICW over financial reporting, managers may trace the advances in TRD to indicate their grasp of these risks (i.e., bad news about the risk) and their efforts to manage and remediate it (i.e., good or optimistic news about risk) (Kravet and Muslu, 2013).

risk. Accordingly, we identify each filing's aggregate risk disclosure, good news, and bad news about risk using the terms shown in Appendix B.

Following textual analysis literature (see the review of Loughran and McDonald (2016)), we employ automated textual content analysis using Diction 7 software to measure each filing's aggregate risk disclosure, its tone of good or bad news and thus the net tone of the risk. The aggregate risk disclosure score is calculated by the percentage of words that are contained in the complete risk wordlist (i.e., the number of words indicating the aggregate risk scaled by the total number of words in the 10-K). Similarly, each filing is further assessed based on its tone of good or bad news about risk. The score of good news about risk is calculated by the percentage of words that are classified as having a positive side, while the percentage of words that are classified as having a negative side is calculated to measure the score of bad news about risk. The score for net tone of risk is calculated as the net difference between good and bad news about risk.

Following prior research (e.g., Abraham and Cox, 2007; Elshandidy and Shrives, 2016), we check the reliability and validity of the TRD scores generated by the complete risk wordlist as follows. The reliability of the aggregate risk disclosure scores and tone of risk (good news, bad news, and net tone of risk) is tested using Cronbach's alpha. This statistical test enables to judge the extent to which a dataset captures a particular underlying construct. The Cronbach's alpha of 82.99% for the computed scores of the TRD implies that the internal consistency between the aggregate risk disclosure and its tone is higher than the generally accepted value in the social science of 70% (Abraham and Cox, 2007). In terms of the validity check, we test the correlation between TRD scores that are generated by the complete risk wordlist of Elshandidy and Shrives (2016) and that of Kravet and Muslu (2013).[64] Our full sample's results show that both risk wordlists are highly correlated (r = 0.85 at the 1% significance level), which implies that the two risk wordlists in

[64] The risk wordlist of Kravet and Muslu (2013) comprises 20 risk-related keywords (where * implies that suffixes are allowed): can/cannot, could, may, might, risk*, uncertain*, likely to, subject to, potential*, vary*/varies, depend*, expos*, fluctuat*, possibl*, susceptible, affect, influenc*, and hedg*.

common capture a large proportion of risk disclosure from the 10-K narratives. Taken together, it is concluded that the computed TRD scores are both valid and reliable.

4.4.3. Empirical model

To test H1 and H2, we employ a fixed effects model using all internal control audited data for our sample period. Using a fixed effects model enables us to account for changes in TRD as a result of the effectiveness of internal controls during the period of the study (equation 4.1), plus changes in market assessment or benefit as a result of the observed risk information and ICW (equation 4.2).[65] The model also accounts for bias that would arise in the dependent variable due to firm and/or industry-specific effects; it also excludes the effects of time-invariant covariates. Then, we additionally estimate a propensity-matched pairs sample to test H1 and H2. The propensity score matching technique is chosen consistent with Donelson et al. (2017) because it facilitates to obtain a sample of non-ICW firms that have the nearest observable characteristics to ICW firms. The matched pairs technique also allows us to control for possible correlated omitted variables. To this end, we use the possible determinants of ICW (e.g., Doyle et al., 2007b) to estimate a logit model of the probability of ICW (equation 4.3). We also employ a fixed effects model to test H1 (equation 4.1) and H2 (equation 4.2) using the estimated propensity-matched pairs sample.

$$TRD_{it} = B_o + B_1\, ICW_{it} + \sum_{j=1}^{nj} \delta_j\, Control\ Variables_{jit} + \varepsilon_{it} \quad (4.1)$$

In equation 4.1, *TRD*, in separate tests, equals the score of aggregate risk disclosure (AGG_RISK), and the scores of the tone of risk as good news (GOOD_RISK), bad news (BAD_RISK), or net tone of risk (NET_RISK). *ICW*, our independent variable of interest, is a dummy variable that takes a value of one if the external auditor issued an adverse opinion on the

[65] Unreported post-estimation tests of Breusch and Pagan Lagrangian multiplier and Hausman are used to assess the choice between the panel and OLS regressions. In our analyses, we also adjust the standard errors for serial dependence and heteroskedastic bias.

firm's internal control system (ICW exists), and zero if the opinion is clean (ICW does not exist). Following prior literature on TRD (e.g., Campbell et al., 2014; Elshandidy and Shrives, 2016) and internal control (e.g., Deumes and Knechel, 2008; Ashbaugh-Skaife et al., 2008; Feng et al., 2009), our set of control variables includes inside ownership concentration and capital structure, which we employ as surrogates for agency problems in addition to two dummy variables: big four auditors as a surrogate for external audit quality and auditor opinion on financial statements. In addition, we control for firm characteristics including size, profitability, liquidity, performance, and growth, as well as market beta. The definitions and measures of these control variables are provided in detail in Appendix A.

$$MA_{it+1} = B_0 + B_1\, ICW_{it} + B_2\, TRD_{it} + B_3\, ICW * TRD_{it} + \sum_{j=1}^{nj} \delta_j\, Control\, Variables_{jit} + \varepsilon_{it} \quad (4.2)$$

In equation 4.2, *MA* denotes market assessment (i.e., informativeness) which, in separate tests, is proxied by market liquidity as represented by bid-ask spread (SPREAD) and Amihud's (2002) illiquidity ratio (ILLIQ); investor-perceived risk as represented by the volatility of market returns (SD).[66] These dependent variables are measured, based on daily data, as the average over 60 trading days period beginning two trading days after the 10-K filing (e.g., Kravet and Muslu, 2013; Campbell et al., 2014). Consistent with prior research (e.g., Leuz and Verrecchia, 2000; Elshandidy and Shrives, 2016), we make our examining period long enough for investors to assess TRD and ICW reporting, but short enough to limit the influence of confounding events. Regarding our independent variables of interest, TRD and ICW are as defined in equation 4.1, while $TRD * ICW$ represents their interaction so as to capture whether TRD is informative to make investors revise their assessment about ICW reporting. Control variables are common to those present in

[66] Bid-ask spread and stock return volatility are well-established proxies for market liquidity and investor-perceived risk in accounting literature (e.g., Leuz and Verrecchia; Campbell et al., 2014; Kravet and Muslu, 2013; Elshandidy and Shrives, 2016). Amihud's (2002) illiquidity measure is one of the most widely used liquidity proxies in the finance literature (Lou and Shu, 2017). It can be explained as the daily price response associated with one dollar of trading volume, thus serving well in capturing stock liquidity and price impact. For more details about the measure's construction and advantages, refer to Amihud (2002) and Lou and Shu (2017).

equation 4.1, but, consistent with prior research on the informativeness of general disclosure and TRD (e.g., Leuz and Verrecchia, 2000; Campbell et al., 2014; Elshandidy and Shrives, 2016) and internal control (e.g., El-Mahdy and Park, 2014; Dowdell et al., 2013; Gupta et al., 2018), we further control for dividends payout (dichotomous) and other market factors of the book to market ratio and trading volume. All independent and control variables are measured at fiscal year-end t, and detailed variable definitions and measures are provided in Appendix A.

$$Prob(ICW_{it} = 1) = F(B_0 + \sum_{j=1}^{nj} \delta_j \; ICW \; Determinants_{jit}) \quad (4.3)$$

Equation 4.3 indicates the logit model used to estimate our propensity-matched pairs sample. Again, following Donelson et al. (2017), we employ the control variables used in equation 4.2 as the model's predictors because Doyle et al. (2007b) suggest these control variables as possible determinants of ICW over financial reporting. By so doing, we obtain the predicted probabilities required to generate our matched-pairs sample. By only retaining pairs with scores that match within 0.05, we test H1 and H2 using fixed effects regressions.

4.5. Empirical Results and Discussion

4.5.1. Descriptive statistics

Panel B of Table 4.1 reports summary statistics for the explanatory, control as well as dependent variables (for equation 4.1: TRD including aggregate risk, its tone of good news, bad news, and risk net tone; for equation 4.2: bid-ask spread and illiquidity ratio as proxies for market liquidity and the mean of the volatility of market returns as a proxy for investor-perceived risk). These descriptive statistics are shown for the entire dataset that consists of 3,043 firm-year observations, of which 222 firm-year observations have ineffective internal controls (i.e., at least one ICW exists at year-end). Continuous variables are winsorized at 1% on both tails to mitigate the effect of outliers.

Over the sample period where the external auditor attestation on the internal controls becomes into effect, on average, the percentage of words that reflect aggregate risk information represents about 1.30% relative to the total number of words disclosed by US non-financial firms in their 10-Ks. On average, about 0.48% of the 10-Ks words suggesting bad news related to risk, while 0.35% of words suggest good news about risk. This implies that about 0.47% (1.30% - 0.48% - 0.35%) of the 10-Ks words represent a neutral tone associated with risk disclosure. With net tone about risk averaging about -0.13%, likely, as a result, the US non-financial firms' sentiment in their 10-Ks becomes marginally more pessimistic (or less optimistic) in disclosing risk-related information when external auditors start to opine on their internal control system.

Table 4.1.
Panel A: Sample details

Sample selection	Firm-year observations
All Compustat firms for fiscal years 2004, 2005, and 2006	33233
Excluding:	
Foreign firms	5,939
Financial firms (SIC 6000-6999)	8042
Firms with a fiscal year end other than December 31	7,065
Auditor disclaimer of opinion on internal control or delayed filing	6,341
Companies with Compustat equity market capitalization less than $75 million (or missing) at the end of their fiscal endings	1,669
Missing data of audit, financial, ownership structure and market information	1134
Final firm-year observations	**3,043**

Panel B: Descriptive statistics

Variable	Obs.	Mean	Median	Std. Dev.	Q1	Q3
Textual risk disclosure (TRD):						
AGG_RISK	3043	1.294	1.288	0.281	1.102	1.481
BAD_RISK	3043	0.476	0.463	0.125	0.386	0.549
GOOD_RISK	3043	0.346	0.335	0.138	0.242	0.432
NET_TONE	3043	-0.131	-0.129	0.150	-0.232	-0.032
Market assessment (*usefulness*) indicators:						
SPREAD	3043	0.192	0.126	0.194	0.078	0.225
ILLIQ	3043	0.138	0.016	0.393	0.004	0.078
SD	3043	0.022	0.020	0.011	0.015	0.026
Explanatory and control variables:						
ICW	3043	0.073	0.000	0.260	0.000	0.000
INSIDE_OWN	3043	0.205	0.157	0.193	0.034	0.302
DEBT_EQU	3043	0.702	0.371	1.563	0.026	0.868
AUD_OPIN	3043	0.467	0.000	0.499	0.000	1.000
BIG_4	3043	0.917	1.000	0.276	1.000	1.000
LN_TA	3043	6.911	6.726	1.733	5.635	8.022

ROE	3043	0.069	0.116	0.331	0.039	0.189
CR	3043	2.796	1.960	2.471	1.310	3.230
FFO	3043	0.171	0.167	0.557	0.071	0.349
GROWTH	3043	0.202	0.129	0.341	0.052	0.261
BETA	3043	1.329	1.231	0.683	0.846	1.734
BM	3043	0.414	0.373	0.227	0.248	0.551
TRAD_VOL	3043	0.849	0.680	0.643	0.418	1.079
DIVIDENDS	3043	0.426	0.000	0.495	0.000	1.000

Panel A of this table summarizes our sample construction. **Panel B** of this table presents summary statistics for the dependent variables used to test H1, i.e., TRD including aggregate risk disclosure and its tone of good news, bad news, as well as risk net tone. It also comprises dependent variables used to test H2, denotes market assessment indicators including bid-ask spread and Amihud's (2002) illiquidity ratio as proxies for market liquidity, and the mean of the volatility (standard deviation) of market returns as a proxy for investor-perceived risk. ICW is the main independent variable of interest related to H1, while our set of control variables includes inside ownership concentration and capital structure which we employ as surrogates for agency problems in addition to two dummy variables for big four auditors as surrogate for external audit quality, and auditor opinion on financial statements. In addition, we control for firm characteristics including size, profitability, liquidity, performance and growth, as well as market CAPM beta. The main independent variables of interest related to H2 include ICW and TRD including aggregate risk disclosure and its tone implies whether it is good news or bad news and the net tone of the risk information. In addition to the control variables used for H1, we further control for dividends payout (dichotomous) and other market factors of the book to market ratio and trading volume. All continuous variables are winsorized at 1% on both tails. Variable definitions, measures, and sources are provided in Appendix A.

Furthermore, we examine the difference-in-means between ICW and non-ICW firms using a t-statistics test (unreported for brevity).[67] Comparative to non-ICW firms, the univariate tests indicate that ICW firms are more likely to disclose relatively less (more) good news about risk and net tone about risk (bad news about risk) (|t|-statistics of 3.085, 4.817 at the 1%, and 2.332 at the 5% significance level, respectively). This initially supports our hypothesis that managers of firms with effective internal controls would be in a better position to signal more good news and net tone about the risk (Feng et al., 2009; Elshandidy and Shrives, 2016), whereas, the cost of the publicly reported ICW may prompt managers to respond by increasing higher bad news about the risk (Skinner, 1994; Deumes and Knechel, 2008; Kothari et al., 2009b; Bao et al., 2019). The t-tests show statistically insignificant difference between aggregate risk disclosure levels for ICW and non-ICW firms. This result, though unexpected, accords with Elshandidy and Shrives' (2016) finding that aggregate risk disclosure is less likely to be associated with firms' environmental incentives.

[67] Since the univariate test (as opposed to the multivariate analysis) gives evidence regarding the effect of each variable in isolation and in a static model, interpreting its results should be done with caution.

The univariate tests additionally reveal greater information asymmetry and investor-risk perceptions for ICW firms in comparison to non-ICW firms (|t|-statistics of 3.964 and 4.427 at the 1% level, respectively). This provides initial support to our hypothesis that ICW reporting is informative to market participants. In terms of the control variables, we observe that ICW firms are more likely to receive an unqualified audit opinion on their financial statements, and are more likely to have higher market beta, book to market ratio, and trading volume than non-ICW firms (|t|-statistics of 2.283, 4.703, 2.475, and 2.379 at the 5% significance level or better, respectively). We also observe that ICW firms are smaller, have lower profitability and are less likely to report dividends payout than non-ICW firms (|t|-statistics of 5.644, 2.826, and 5.879 at the 1% significance level, respectively). Overall, these statistically significant differences are consistent with results obtained from studies on the determinants of ICW (e.g., Doyle et al., 2007b), and so are valid to be used in estimating our ICW logit model in equation 4.3. These results also illustrate the importance of controlling for these innate firm characteristics in our analyses.

Table 4.2 reports the pair-wise correlations (Pearson product moment correlations are exhibited on the upper-right-hand portion, and Spearman rank-order correlations are exhibited on the lower-left-hand portion). For the sake of facilitation, we discuss the Pearson correlations but note that the Spearman rank-order correlations are generally consistent with the Pearson correlations. The aggregate risk disclosure is found positively associated with both bad news (0.81) and good news (0.73) about risk, which implies that US non-financial firms significantly employ the tone of risk information to communicate signals about risks involved in their aggregate risk disclosure. Consistent with our descriptive statistics, the ICW variable is negatively (positively) correlated with good news (-0.06) and net tone about risk (-0.09) (bad news about risk; 0.04). The ICW variable also reveals a positive correlation with bid-ask spread (0.07) and the volatility of stock return (0.08). As expected, market liquidity and risk perception proxies exhibit relatively large positive correlations (SPREAD and ILLIQ (0.82), SD and SPREAD (0.31), and SD and ILLIQ (0.21)). Consistent with Kravet and Muslu (2013), aggregate risk disclosure presents a positive

correlation with the volatility of stock return (0.04). Consistent with Elshandidy and Shrives (2016), good news and net tone about risk are positively (negatively) correlated with market liquidity (investor-perceived risk) proxies, while bad news about the risk has opposite directions; $|r|$ ranging from about 0.07 to about 0.21.[68]

4.5.2. Testing H1 and H2 using the entire sample

Table 4.3 shows results related to H1, which addresses whether ICE influences the level of TRD. Across each of the four models' estimations, ICW is negatively associated with the level of aggregate risk disclosure, its tone of bad news, good news and net tone of risk. Despite the statistically trivial result in respect of bad news about risk (it becomes statistically significant at the 5% level in our propensity-matched sample, which we utilize later), this finding collectively indicates that firms with an ineffective internal control system exhibit significantly lower levels of risk information, particularly in terms of aggregate risk disclosure (t-statistic -2.009 at 5% significance level), its tone of good news (t-statistic -2.720 at 1% significance level) and the net tone about risk (t-statistic -1.988 at 5% significance level). That is, all else being equal, the economic significance of having effective internal controls is related to higher TRD at 3.09% (0.040/1.294) of the mean of aggregate risk disclosure, 1.68% (0.008/0.476) of the mean of bad news, 6.36% (0.022/0.346) of the mean of good news and 9.92% (0.013/0.131) of the mean of the net tone about risk. This evidence supports H1 that, compared to having effective internal controls, the existence of an ICW implies an information problem in the firm's detection and reporting system. Consequently, managers of firms with ICW are less likely to disclose high levels of TRD because their internal control system is ineffective in revealing the unknown and inherent risk factors and uncertainties.

[68] In addition, the correlation coefficients are also used to diagnose multicollinearity. The unreported variance inflation factors (VIFs) are less than 10, ranging from 1.03 to 1.62, which implies that multicollinearity is not inherent in our multivariate regressions (Ashbaugh-Skaife et al., 2008).

Table 4.2.
Pearson (top) and Spearman (bottom) correlation coefficients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 AGG_RISK		**0.806**	**0.728**	-0.003	-0.024	-0.023	**0.044**	-0.003	-0.017	**-0.048**	**0.037**	0.012	**-0.039**	**0.055**	**0.086**	**0.076**	-0.008	**0.127**	-0.005	**0.082**	-0.007
2 BAD_RISK	**0.796**		**0.331**	**-0.520**	**0.072**	0.031	**0.089**	**0.042**	-0.011	**-0.036**	0.023	-0.001	**-0.075**	**-0.108**	**0.175**	**-0.052**	**-0.050**	**0.189**	**0.051**	**0.082**	**-0.121**
3 GOOD_RISK	**0.726**	**0.341**		**0.630**	**-0.165**	**-0.096**	**-0.142**	**-0.056**	**-0.055**	**0.037**	**0.095**	**0.081**	**0.229**	**0.319**	**-0.226**	**0.237**	-0.033	**-0.088**	0.016	**-0.063**	**0.292**
4 NET_TONE	0.029	**-0.468**	**0.627**		**-0.209**	**-0.113**	**-0.206**	**-0.087**	**-0.040**	**0.066**	**0.069**	**0.075**	**0.273**	**0.380**	**-0.352**	**0.258**	0.011	**-0.237**	-0.024	**-0.126**	**0.369**
5 SPREAD	-0.018	**0.079**	**-0.179**	**-0.234**		**0.815**	**0.314**	**0.072**	**0.190**	**-0.053**	**-0.095**	**-0.209**	**-0.495**	**-0.278**	**0.156**	**-0.232**	-0.035	-0.002	**0.160**	**-0.258**	**-0.169**
6 ILLIQ	-0.003	**0.077**	**-0.197**	**-0.249**	**0.869**		**0.208**	0.026	**0.136**	**-0.057**	**-0.088**	**-0.156**	**-0.315**	**-0.140**	**0.111**	**-0.106**	-0.027	**-0.067**	**0.125**	**-0.226**	**-0.079**
7 SD	**0.055**	**0.129**	**-0.190**	**-0.280**	**0.427**	**0.496**		**0.080**	**0.134**	**-0.092**	**-0.154**	**-0.097**	**-0.427**	**-0.268**	**0.219**	**-0.181**	**0.112**	**0.314**	**-0.094**	**0.182**	**-0.310**
8 ICW	0.002	**0.040**	**-0.055**	**-0.086**	**0.126**	**0.134**	**0.122**		0.029	0.010	**0.041**	-0.035	**-0.102**	**-0.051**	-0.011	-0.002	-0.014	**0.085**	**0.045**	**0.043**	**-0.106**
9 INSIDE_OWN	-0.017	-0.020	**-0.076**	**-0.052**	**0.300**	**0.365**	**0.226**	**0.047**		0.028	**-0.092**	**-0.102**	**-0.246**	**-0.046**	**0.075**	-0.018	-0.018	0.028	-0.007	**-0.130**	**-0.076**
10 DEBT_EQU	**-0.116**	**-0.138**	**0.112**	**0.232**	**-0.172**	**-0.284**	**-0.306**	**-0.040**	**-0.102**		**0.084**	**0.079**	**0.232**	**0.081**	**-0.172**	**-0.053**	-0.026	-0.022	**-0.048**	-0.020	**0.081**
11 AUD_OPIN	**0.038**	0.028	**0.092**	**0.069**	**-0.106**	**-0.196**	**-0.191**	**0.041**	**-0.109**	**0.168**		**0.079**	**0.246**	0.024	**-0.152**	-0.001	**-0.042**	**-0.121**	**0.096**	-0.002	**0.112**
12 BIG_4	0.008	-0.005	**0.076**	**0.079**	**-0.231**	**-0.260**	**-0.135**	-0.035	**-0.124**	**0.166**	**0.079**		**0.287**	**0.043**	**-0.118**	-0.033	-0.023	0.022	0.030	**0.044**	**0.084**
13 LN_TA	**-0.047**	**-0.105**	**0.240**	**0.317**	**-0.656**	**-0.825**	**-0.560**	**-0.107**	**-0.310**	**0.541**	**0.240**	**0.303**		**0.290**	**-0.435**	**0.147**	**-0.094**	**-0.244**	**0.106**	**-0.058**	**0.465**
14 ROE	0.027	**-0.182**	**0.317**	**0.441**	**-0.410**	**-0.439**	**-0.280**	**-0.119**	**-0.111**	**0.137**	0.020	**0.059**	**0.347**		**-0.241**	**0.503**	**-0.100**	**-0.186**	0.001	**-0.072**	**0.277**
15 CR	**0.103**	**0.180**	**-0.195**	**-0.337**	**0.227**	**0.328**	**0.368**	-0.007	**0.168**	**-0.521**	**-0.189**	**-0.109**	**-0.519**	**-0.249**		**-0.195**	**0.079**	**0.259**	**-0.050**	**0.178**	**-0.283**
16 FFO	**0.078**	**-0.079**	**0.197**	**0.223**	**-0.262**	**-0.195**	**-0.121**	**-0.055**	-0.019	**-0.361**	**-0.038**	-0.030	0.006	**0.474**	**0.064**		**-0.042**	**-0.062**	-0.016	0.004	**0.121**
17 GROWTH	0.015	**-0.103**	**0.049**	**0.128**	**-0.095**	**-0.050**	**0.178**	-0.010	-0.022	**-0.089**	**-0.062**	-0.017	**-0.083**	**0.135**	**0.091**	**0.108**		**0.111**	**-0.122**	**0.202**	**-0.146**
18 BETA	**0.135**	**0.197**	**-0.071**	**-0.224**	**0.074**	**0.123**	**0.403**	**0.076**	**0.096**	**-0.220**	**-0.105**	0.019	**-0.234**	**-0.165**	**0.337**	**-0.036**	**0.149**		**-0.077**	**0.395**	**-0.295**
19 BM	-0.002	0.032	**0.041**	0.010	**0.229**	**0.196**	**-0.093**	**0.047**	-0.022	**0.095**	**0.103**	**0.045**	**0.126**	**-0.295**	**-0.067**	**-0.165**	**-0.174**	**-0.081**		**-0.156**	**0.064**
20 TRAD_VOL	**0.085**	**0.094**	**-0.069**	**-0.135**	**-0.317**	**-0.293**	**0.239**	**0.041**	**-0.112**	**-0.126**	0.018	**0.062**	-0.018	0.008	**0.216**	**0.061**	**0.235**	**0.415**	**-0.176**		**-0.283**
21 DIVIDENDS	-0.005	**-0.127**	**0.293**	**0.387**	**-0.244**	**-0.309**	**-0.430**	**-0.106**	**-0.144**	**0.288**	**0.112**	**0.084**	**0.463**	**0.336**	**-0.335**	**0.062**	**-0.159**	**-0.287**	**0.085**	**-0.323**	

This table reports the correlation coefficients of all variables that are related to test H1 (ICE and TRD) and H2 (market assessment to the disclosed risk information and reported ICW). Bold numbers indicate significance based on two-tailed t-tests, at the .05 level or better. All continuous variables are winsorized at 1% on both tails. Variable definitions, measures, and sources are provided in Appendix A.

Our results extend the conclusions drawn by prior research by suggesting that ICW affects not only the accuracy (e.g., Feng et al., 2009) and quality (e.g., Chan et al., 2008) of information or decisions by managers (e.g., Cheng et al., 2013) but also the amount of their TRD in the 10-K filings. Turning to the control variables, firm size and market beta appear to be the most influential factors on the level of TRD, either for the aggregate risk disclosure or its tone of bad news, good news and net tone about the risk. These results are consistent with prior research on risk disclosure (e.g., Abraham and Cox, 2007; Elshandidy and Shrives, 2016), where risky firms are motivated to detail their risk exposure and procedures followed to mitigate it. Large firms are more likely to own resources required for establishing a strong risk management system that are able to detect and convey risk information efficiently.

Table 4.3.
Fixed effect panel regressions of the impact of ICE on TRD

VARIABLES	AGG_RISK	BAD_RISK	GOOD_RISK	NET_TONE
	Model (1)	Model (2)	Model (3)	Model (4)
Explanatory variable:				
ICW	-0.040**	-0.008	-0.022***	-0.013**
	(-2.009)	(-1.127)	(-2.720)	(-1.988)
Control Variables:				
INSIDE_OWN	0.013	0.004	0.007	0.006
	(0.235)	(0.174)	(0.319)	(0.367)
DEBT_EQU	-0.003	-0.000	-0.000	0.000
	(-0.626)	(-0.223)	(-0.261)	(0.044)
AUD_OPIN	0.013	0.008**	0.003	-0.006*
	(1.416)	(2.370)	(0.647)	(-1.801)
BIG_4	0.014	0.009	-0.005	-0.015
	(0.374)	(0.585)	(-0.452)	(-1.481)
LN_TA	0.066***	-0.006	0.039***	0.044***
	(3.063)	(-0.693)	(4.254)	(5.354)
ROE	0.006	-0.021*	0.019*	0.040***
	(0.170)	(-1.732)	(1.696)	(5.121)
CR	0.003	0.003	-0.000	-0.003*
	(0.574)	(1.317)	(-0.111)	(-1.850)
FFO	0.017	0.000	0.015**	0.015**
	(0.947)	(0.010)	(2.493)	(2.487)
GROWTH	-0.015	-0.013**	0.001	0.015***
	(-0.970)	(-2.085)	(0.206)	(2.878)
BETA	0.029***	0.013***	0.007*	-0.006*
	(2.772)	(3.306)	(1.767)	(-1.727)
Constant	0.772***	0.482***	0.065	-0.413***
	(5.159)	(8.552)	(1.011)	(-7.221)
Observations	3,043	3,043	3,043	3,043

R-squared	0.015	0.016	0.022	0.048
F-value	2.616***	2.580***	4.151***	8.493***

This table reports the coefficients on the explanatory variables of the fixed effects panel regression models. It examines H1 to answer the first research question about whether ICE (proxied by ICW) influences TRD? Robust standard errors adjusted for clustering at the firm level. T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions, measures, and sources are provided in Appendix A.

Table 4.4 presents results related to H2 — whether ICW reporting by the external auditor and TRD by management are useful to the market. Across regression estimates for market liquidity (SPREAD and ILLIQ) and investor-perceived risk (SD), results suggest that ICW reporting is statistically not significant to the market participants. This finding accords with previous research (e.g., Dowdell et al., 2013; Gupta et al., 2018) that argues but fails to find any evidence on the usefulness of ICW reported by the auditor to the capital market. That is, the evidence obtained from our entire sample in terms of the informativeness of the ICW reporting suggests negligible usefulness to market liquidity and investors' perceived risk and thus, partially does not support H2. Gupta et al. (2018) suggest the rich information context preceding the release of SOX 404 (b) report as a potential factor that distorts observation of the usefulness of ICW reporting. Therefore, in order to mitigate such distorting factors, we conduct subsequent tests focusing our analysis on a propensity-matched sample to inspect the market assessment of ICW reporting while ICW firms have the nearest observable characteristics to non-ICW firms.

Table 4.4.
Fixed effect panel regressions of the impact of ICW reporting and TRD on market liquidity and investor-perceived risk

VARIABLES	Market liquidity (*t+1*)						Investor-perceived risk (*t+1*)		
	SPREAD	SPREAD	SPREAD	ILLIQ	ILLIQ	ILLIQ	SD	SD	SD
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
Explanatory variables:									
ICW	-0.026	-0.043	0.009	-0.083	-0.116	0.002	0.000	0.002	0.002
	(-0.667)	(-0.993)	(0.825)	(-0.861)	(-1.074)	(0.095)	(0.119)	(0.620)	(1.017)
AGG_RISK	-0.030**			-0.030			-0.001		
	(-2.212)			(-1.028)			(-0.570)		
BAD_RISK		0.020			0.131			-0.002	
		(0.385)			(1.053)			(-0.620)	
GOOD_RISK		-0.091***			-0.178**			0.001	
		(-2.943)			(-2.555)			(0.259)	
NET_TONE			-0.063*			-0.172**			0.001
			(-1.774)			(-2.024)			(0.397)
AGG*ICW	0.025			0.065			0.001		
	(0.788)			(0.847)			(0.384)		
BAD*ICW		0.048			0.125			0.001	

		(0.474)			(0.606)			(0.109)	
GOOD*ICW		0.078			0.168			-0.000	
		(1.212)			(1.043)			(-0.050)	
NET*ICW			0.009			0.009			-0.001
			(0.115)			(0.067)			(-0.208)
Control variables:									
INSIDE_OWN	0.039	0.040	0.040	0.103	0.105	0.106	0.002	0.002	0.002
	(1.093)	(1.112)	(1.107)	(1.321)	(1.351)	(1.361)	(0.761)	(0.753)	(0.745)
DEBT_EQU	0.003	0.003	0.003	0.002	0.002	0.002	-0.000*	-0.000*	-0.000*
	(1.405)	(1.454)	(1.451)	(0.544)	(0.600)	(0.585)	(-1.676)	(-1.679)	(-1.680)
AUD_OPIN	0.000	-0.000	-0.000	-0.018	-0.020	-0.019	-0.002***	-0.002***	-0.002***
	(0.046)	(-0.049)	(-0.086)	(-1.414)	(-1.512)	(-1.504)	(-5.242)	(-5.209)	(-5.248)
BIG_4	0.072**	0.071**	0.071**	0.132**	0.131**	0.130**	0.003**	0.003**	0.003**
	(2.364)	(2.362)	(2.364)	(2.098)	(2.089)	(2.068)	(2.306)	(2.293)	(2.281)
LN_TA	-0.096***	-0.093***	-0.095***	-0.138***	-0.131***	-0.132***	-0.004***	-0.004***	-0.004***
	(-7.052)	(-7.126)	(-7.300)	(-4.428)	(-4.531)	(-4.662)	(-3.517)	(-3.592)	(-3.592)
ROE	-0.074***	-0.072***	-0.072***	-0.123***	-0.117***	-0.116***	-0.000	-0.000	-0.000
	(-4.182)	(-4.106)	(-4.065)	(-2.943)	(-2.773)	(-2.755)	(-0.267)	(-0.305)	(-0.294)
CR	-0.008***	-0.008***	-0.008***	-0.012*	-0.013*	-0.013**	-0.000*	-0.000*	-0.000*
	(-2.851)	(-2.924)	(-2.993)	(-1.887)	(-1.948)	(-1.970)	(-1.864)	(-1.854)	(-1.861)
FFO	-0.007	-0.006	-0.007	0.001	0.003	0.003	0.000	0.000	0.000
	(-0.715)	(-0.624)	(-0.674)	(0.038)	(0.128)	(0.112)	(0.104)	(0.089)	(0.081)
GROWTH	-0.005	-0.004	-0.004	-0.009	-0.007	-0.007	0.000	0.000	0.000
	(-0.575)	(-0.496)	(-0.443)	(-0.391)	(-0.309)	(-0.300)	(0.646)	(0.618)	(0.636)
BETA	0.011	0.010	0.010	0.032**	0.030*	0.030*	-0.001*	-0.001*	-0.001*
	(1.570)	(1.483)	(1.408)	(2.008)	(1.876)	(1.875)	(-1.717)	(-1.684)	(-1.713)
TRAD_VOL	-0.043***	-0.043***	-0.043***	-0.065**	-0.065**	-0.064**	-0.001**	-0.001**	-0.001**
	(-3.468)	(-3.452)	(-3.479)	(-2.112)	(-2.112)	(-2.091)	(-2.098)	(-2.092)	(-2.120)
BM	0.194***	0.189***	0.190***	0.404***	0.391***	0.393***	-0.001	-0.001	-0.001
	(6.143)	(6.082)	(6.087)	(4.791)	(4.805)	(4.838)	(-0.724)	(-0.641)	(-0.655)
DIVIDENDS	0.001	0.001	0.000	-0.009	-0.009	-0.009	0.001	0.001	0.001
	(0.069)	(0.057)	(0.028)	(-0.168)	(-0.166)	(-0.164)	(0.420)	(0.416)	(0.409)
Constant	0.785***	0.756***	0.735***	0.892***	0.811***	0.797***	0.053***	0.053***	0.053***
	(8.315)	(8.048)	(8.043)	(4.322)	(4.294)	(4.139)	(6.623)	(6.641)	(6.635)
Observations	3,043	3,043	3,043	3,043	3,043	3,043	3,043	3,043	3,043
R-squared	0.159	0.160	0.157	0.086	0.089	0.088	0.054	0.054	0.054
F-value	9.892***	8.996***	9.454***	4.988***	4.515***	4.898***	6.074***	5.437***	6.020***

This table reports the coefficients on the explanatory variables of the fixed effects panel regression models. It examines H2 to answer the second research question about whether ICE attestation by the external auditor and management's TRD are useful to the market? Robust standard errors adjusted for clustering at the firm level. T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions, measures, and sources are provided in Appendix A.

Table 4.4 also shows that the level of aggregate risk disclosure negatively and significantly impacts information asymmetry by reducing the bid-ask spread (t-statistics -2.212 at the 5% significance level). To put this in an economic perspective, all else being equal, a one-standard-deviation increase in aggregate risk disclosure is associated with 0.84% (-0.030 * 0.281) lower bid-ask spread; i.e., higher market liquidity. Market liquidity results are in line with the findings of

Campbell et al. (2014) about the impact of aggregate risk disclosure on bid-ask spread. This evidence is also consistent with the theoretical literature (e.g., Diamond, 1985; Amihud and Mendelson 1986) on the unidirectional influence of disclosure on reducing the information asymmetry. While this statistically and economically significant evidence suggests higher confidence in the fairness of stock transactions and increased trading volume,[69] unexpectedly, aggregate risk disclosure is apparently statistically insignificant in terms of investor-perceived risk.

When we distinguish the good news and bad news about risk (i.e., aggregate risk disclosure tone), shown under Models 2, 5 and 8 in Table 4.4, the results suggest that market participants are more likely to appreciate good news compared to bad news about risk. Whilst bad news information attracts trivial interest from the market, good news about risk entails a significant positive market liquidity. Specifically, good news about risk is associated with a lower SPREAD and ILLIQ (t-statistics -2.943 and -2.555 at the 1% and 5% significance levels, respectively). That is, all else being equal, a one-standard-deviation increase in good news about risk results in -1.26% (-0.091 * 0.138) decrease in SPREAD and 2.46% (-0.178 * 0.138) decrease in ILLIQ. Similar inferences are derived from the net tone about risk (obtained by the adjusted score of good news about risk after deducting the score of bad news, which are reported under Models 3, 6 and 9 in Table 4.4), where t-statistics are -1.774 and -2.024 for the SPREAD and ILLIQ at the 10% and 5% levels of significance, respectively.

Here, results about the good news and/or tone about risk in a firm's 10-Ks suggest a decrease in the firm's information asymmetry and thus, more active buyers and sellers of the security and tighter bid-ask spreads (Elshandidy and Shrives, 2016). Like the aggregate risk disclosure, the tone of good and bad news about risk show statistically insignificant effect on investor-perceived risk. While the insignificant finding for volatility is unexpected to us with the significant impact of TRD on market liquidity, Leuz and Verrecchia (2000) attribute such a finding to other factors, such as

[69] In unreported analyses, we affirm this conclusion by using trading volume as a proxy for market liquidity (e.g., Leuz and Verrecchia, 2000).

the type of investors attracted to the firm and infrequently traded stocks, that influence volatility and are unrelated to investor-perceived risk.[70] In addition, with respect to the interaction between ICW reporting and TRD, our entire sample analysis fails to discover any statistical significance to the market. Collectively, our findings are partially consistent with H2, that the level and tone of aggregate risk disclosure in the 10-K are informative.

4.5.3. Testing H1 and H2 using the propensity-matched pairs sample

Panel A of Table 4.5 presents logit regression estimates drawn by equation 4.3 for the probability of ICW.[71] We match 222 firm-year observations for the treatment group, i.e., firms with a reported ICW, to their pairs from firm-year control group observations, i.e., firms without any ICW during the entire sample period. Panel B of Table 4.5 presents the t-test results for the effectiveness of the mean of matched covariates between treatment and control subsamples. Thereafter, following prior studies (e.g., Rose-Green et al., 2011; Donelson et al., 2017), we employ a multivariate model to gain more precise estimates of testing H1 and H2 using equations 4.1 and 4.2, respectively, as follows.

Table 4.5.
Propensity score results

Panel A: Logit regression of propensity score matching		**Panel B:** Covariate balance		
VARIABLES	ICW Model	Mean Treatment	Mean Control	t-test Diff. p-value
INSIDE_OWN	0.212	0.225	0.241	0.374
	(0.529)			
DEBT_EQU	0.087**	0.755	0.871	0.483
	(2.107)			
AUD_OPIN	0.522***	0.541	0.514	0.570
	(3.324)			
BIG_4	-0.139	0.883	0.883	1.000
	(-0.556)			
LN_TA	-0.331***	6.283	6.213	0.597
	(-4.635)			
ROE	-0.167	0.009	-0.002	0.714
	(-0.731)			
CR	-0.139***	2.704	2.792	0.676

[70] Managers' sensitivity to providing their firms' private information to avoid public attention that would motivate undesirable action and reduce their firms' cash flow is another possible reason (e.g., Elshandidy and Shrives, 2016).
[71] Consistent with prior research on the determinants of ICW (e.g., Doyle et al., 2007b), we find that firms that received an unqualified audit opinion on their financial statements, and that they are smaller, have lower current ratio, dividends payout, as well as higher beta and book to market ratio are more likely to have ICW.

	(-3.118)			
FFO	0.178	0.166	0.145	0.641
	(1.441)			
GROWTH	-0.341	0.185	0.156	0.271
	(-1.416)			
BETA	0.341***	1.536	1.549	0.854
	(2.895)			
TRAD_VOL	0.182	0.948	0.925	0.731
	(1.557)			
BM	1.087***	0.451	0.445	0.802
	(3.409)			
DIVIDENDS	-0.530**	0.239	0.261	0.585
	(-2.486)			
Constant	-1.119**			
	(-2.182)			
Observations	3,043	222	222	444
Area under the ROC Curve	0.704			
Pseudo R-squared	0.068			

Panel C: Fixed effect panel regressions of TRD on treatment and control groups of ICW

VARIABLES	AGG_RISK	BAD_RISK	GOOD_RISK	NET_TONE
	Model (1)	Model (2)	Model (3)	Model (4)
ICW	-0.110*	-0.045**	-0.049*	-0.007
	(-2.008)	(-2.509)	(-1.946)	(-0.362)
Control variables	Included	Included	Included	Included
Constant	0.628	0.223	0.071	-0.191
	(0.796)	(0.631)	(0.317)	(-0.930)
Observations	444	444	444	444
R-squared	0.170	0.148	0.155	0.112
F-value	11.54***	7.296***	17.09***	12.22***

Panel D: Fixed effect panel regressions of market assessment indicators on the treatment and control groups of ICW, TRD, and their interaction

	Market liquidity (*t+1*)						Investor-perceived risk (*t+1*)		
VARIABLES	SPREAD	SPREAD	SPREAD	ILLIQ	ILLIQ	ILLIQ	SD	SD	SD
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
ICW	0.114	0.191*	0.039	0.411**	0.497***	0.014	-0.005	-0.001	0.003
	(1.100)	(1.757)	(1.245)	(2.129)	(2.682)	(0.282)	(-0.405)	(-0.100)	(0.633)
AGG_RISK	0.029			0.299**			-0.005		
	(0.377)			(2.188)			(-0.543)		
BAD_RISK		0.244			0.694			0.003	
		(0.882)			(1.620)			(0.189)	
GOOD_RISK		-0.142			0.168			-0.013	
		(-0.615)			(0.489)			(-0.613)	
NET_TONE			-0.191			-0.151			-0.015
			(-0.697)			(-0.343)			(-0.835)
AGG*ICW	-0.100			-0.359**			0.004		
	(-1.066)			(-2.384)			(0.370)		
BAD*ICW		-0.605**			-1.233***			-0.017	
		(-2.086)			(-3.277)			(-1.168)	

GOOD*ICW		0.219			0.085			0.025	
		(1.378)			(0.325)			(0.871)	
NET*ICW			0.379*			0.524			0.022
			(1.765)			(1.600)			(1.007)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included	Included
Constant	1.126**	1.046*	1.064*	1.054	0.971	1.177	0.026	0.021	0.018
	(2.152)	(1.988)	(1.900)	(1.373)	(1.259)	(1.444)	(0.883)	(0.941)	(0.878)
Observations	444	444	444	444	444	444	444	444	444
R-squared	0.305	0.373	0.344	0.437	0.480	0.437	0.209	0.243	0.232
F-value	23.14***	110***	76.92***	71.66***	116***	33.37***	12.15***	20.55***	17.94***

Panel A of this table reports the results of propensity score matching logit regression where ICW is the dependent variable. Robust standard errors adjusted for clustering at the firm level. Z-statistics in parentheses. The ICW Model includes variables the are contained in market assessment models and consistent with ICW determinants suggested by Doyle et al. (2007b). **Panel B** of this table reports the covariate balance between matched pairs. T-test statistics are for the difference between treatment group (those with auditor-reported material weaknesses) and control group (those without auditor-reported material weaknesses). **Panel C** of this table reports coefficient estimates and the model summary for the fixed effects panel regressions of aggregate risk disclosure and its tone on treatment and control groups of ICW. Control variables presented in Table 4.3 are included. **Panel D** of this table reports coefficient estimates and the model summary for the fixed effects panel regressions of market assessment indicators on the treatment and control groups of ICW, TRD, and their interaction. Control variables presenting in Table 4.4 are included.
There are 222 firm-year observations for the treatment group, which are matched to 222 firm-year control group observations. Robust standard errors adjusted for clustering at the industry level (2-Digit SIC). T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions are provided in Appendix A.

Panel C of Table 4.5 reports coefficient estimates of regressing aggregate risk disclosure and its tone on ICW utilizing 444 observations from the treatment and control samples. Again, our tests of H1 using equation 4.1 show supportive results to that obtained from the entire sample. Collectively, our results retain their signs and significance (except net tone about risk, which turns insignificant). Specifically, we find that the level of aggregate risk disclosure and its tone of good news and bad news about the risk are statistically and negatively associated with having ineffective internal controls (t-statistic -2.008, -1.946 at 10%, and -2.509 at the 5% significance level, respectively). That is, all else being equal, the economic significance of having effective internal controls is related to higher TRD at 8.51% (0.110/1.292) of the mean of aggregate risk disclosure, 9.26% (0.045/0.486) of the mean of bad news, 15.03% (0.049/0.326) of the mean of good news and 4.35% (0.007/0.161) of the mean of the net tone about risk.[72] This evidence supports H1.

Turning to the market assessment of ICW reporting and TRD (tests of H2 using equation 4.2), Models 2, 4 and 5 under Panel D of Table 4.5 indicate that reporting ICW leads to a significant

[72] The mean used in these calculations is separately estimated for our matched sample (untabulated for brevity).

and positive increase in market illiquidity (t-statistics 1.757 at 10% level for SPREAD of under Model 2, and 2.129 and 2.682 at the 5% and 1% significance levels for ILLIQ of Model 4 and Model 5, respectively).[73] This evidence adds to previous research on the usefulness of ICW reported by the external auditor to the capital market (e.g., Dowdell et al., 2013; Gupta et al., 2018). It also accords with the experimental results of Lopez et al. (2009) and Church and Schneider (2016) about the value-relevance of ICW reporting and complements the findings of Clinton et al. (2014) that illustrate that analysts' coverage declines following ICW reporting. Consistent with the theoretical premise of Lev (1988), and empirical evidence of Gupta et al. (2018) with regard to SOX 302, all else being equal, the economic significance of receiving an adverse eternal auditor opinion under SOX 404 (b) is likely to be associated with a higher (lower) information asymmetry (market liquidity) up to 240.10% (0.497/0.207) of the mean of ILLIQ.

With respect to aggregate risk disclosure and the tone in risk news, despite many results missing statistical significance, their directions are generally consistent with those from the entire sample. It is worth noting that the positive significant relationship between AGG_RISK and ILLIQ under model 4 (t-statistic 2.188 at the 5% significance level) does not contradict the corresponding conclusion obtained from the entire sample because, the direction of aggregate risk disclosure is unexpected until we distinguish its tone (e.g., Kothari et al., 2009a; Kravet and Muslu, 2013; Elshandidy and Shrives, 2016). For example, Kravet and Muslu suggest that the direction of risk information depends on whether the revealed risk information entails known or unknown risk factors. Therefore, consistent with prior research on risk disclosure, which demonstrates the unidirectional influence of aggregate risk disclosure (e.g., Diamond, 1985; Amihud and Mendelson 1986; Brown and Tucker, 2011; Hope et al., 2016), our tests for the informativeness of the aggregate risk disclosure are fundamentally interested in the overall effect, regardless of the sign.

[73] The superior statistics offered by ILLIQ may result from the strong association that it has with the expected stock return and trading volume. Refer to Lou and Shu (2017) for more details.

Thus, all else being equal, the economic significance of this finding suggests that a one-standard-deviation increase in AGG_RISK would result in 8.34% (0.299 * 0.279) increase in ILLIQ.

Further to the above partial support for to H2 regarding the informativeness of ICW reporting and TRD, the interaction results (under Models 2, 3, 4 and 5 for market liquidity, in Panel D of Table 4.5) elucidate that TRD meaningfully conveys useful information that investors utilize to revise their judgment on ICW reporting. Driven by bad news about risk (t-statistics -2.086 and -3.277 at the 5% and 1% significance levels for SPREAD and ILLIQ, respectively), aggregate risk disclosure accompanies ICW reporting significantly and positively impacts the market liquidity proxied by ILLIQ (t-statistic -2.384 at the 5% significance level). However, when ICW reporting is accompanied by net tone of risk disclosure (good news residuals), market liquidity (proxied by SPREAD) is significantly and positively decreased (t-statistic 1.765 at the 10% significance level). This finding suggests that investors may negatively assess the conflict between the credible adverse attestation by the external auditor on the reliability of firm's information and management net tone about risk (Kothari et al., 2009a). On the contrary, consistent with agency theory, managers can reduce information asymmetries around the adverse public signal conveyed by the external auditor through providing a higher amount of aggregate risk disclosure and its tone of bad news about the risk to indicate their realization of their firms' risks (e.g., Lev, 1988; Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; Beyer et al., 2010). This evidence also accords with Bertomeu et al.'s (2011) theoretical argument that disclosing more information can decrease information asymmetry where there is an overlap in the information attained by managers and investors. Besides, empirical studies (e.g., Beneish et al., 2008; Kim and Park, 2009; Kravet and Muslu, 2013; El-Mahdy and Park, 2014) indicate that market participants positively (or less negatively) assess the disclosed information (including TRD) if that information is recognized, expected, and/or related to known risk factors (such as ICW reporting). Again, the findings derived form our matched-pairs sample provide further partial support to H2.

4.5.4. Further and robustness tests

4.5.4.1. Change analysis

Prior research (e.g., Kravet and Muslu, 2013; Elshandidy and Shrives, 2016) proposes a change analysis technique in order to mitigate endogeneity concerns related to correlated omitted covariates and reverse causality, as well as to establish a strong cause-effect relationship between explanatory and dependent variables.[74] Consistent with prior research, in Table 4.6 we define the changes in the aggregate risk disclosure and its tone of bad news and good news about risk, and net tone of risk, respectively, as the differences between a firm's scores and the median score for other firms in the same industry over the years of study. Panel A of Table 4.6 indicates that ICW significantly leads to differences in the aggregate risk disclosure and its tone of bad news, good news and net tone of risk in firms' 10-Ks relative to their industry norm. As expected, and qualitatively consistent with prior findings, results suggest a lower level of aggregate risk disclosure, bad news (while statistically insignificant; t-statistic -1.097), good news and net tone about risk are associated with firms with ICW (t-statistics -1.971 and -1.985 at the 5% for AGG_RISK and NET_TONE, and -2.595 at the 1% significance level for GOOD_RISK).

Table 4.6.
Fixed effect panel regressions results of the impact of ICW on changes in TRD and their usefulness

Panel A: The impact on the change of TRD

VARIABLES	ΔAGG_RISK	ΔBAD_RISK	ΔGOOD_RISK	ΔNET_TONE
	Model (1)	Model (2)	Model (3)	Model (4)
ICW	-0.040**	-0.008	-0.022***	-0.013**
	(-1.971)	(-1.097)	(-2.595)	(-1.985)
Control variables	Included	Included	Included	Included
Constant	-0.515***	0.016	-0.269***	-0.275***
	(-3.346)	(0.284)	(-4.233)	(-5.547)
Observations	3,043	3,043	3,043	3,043
R-squared	0.015	0.016	0.022	0.049
F-value	2.691***	2.825***	3.925***	8.911***

Panel B: The impact on market assessment indicators

	Market liquidity (*t+1*)						Investor-perceived risk (*t+1*)		
VARIABLES	SPREAD	SPREAD	SPREAD	ILLIQ	ILLIQ	ILLIQ	SD	SD	SD

[74] It is important to note that our fixed effects model applied in our above level analysis is adequately able to consider and deal with these issues.

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
ICW	0.006	0.006	0.008	0.000	-0.002	0.001	0.002**	0.002*	0.002*
	(0.652)	(0.733)	(0.920)	(0.014)	(-0.125)	(0.051)	(2.078)	(1.815)	(1.797)
ΔAGG_RISK	-0.031**			-0.031			-0.001		
	(-2.227)			(-1.055)			(-0.549)		
ΔBAD_RISK		0.021			0.132			-0.002	
		(0.415)			(1.055)			(-0.644)	
ΔGOOD_RISK		-0.093***			-0.181***			0.001	
		(-3.013)			(-2.590)			(0.299)	
ΔNET_TONE			-0.064*			-0.174**			0.001
			(-1.809)			(-2.034)			(0.441)
ΔAGG*ICW	0.029			0.076			0.001		
	(0.852)			(0.975)			(0.289)		
ΔBAD*ICW		0.035			0.128			0.002	
		(0.330)			(0.615)			(0.241)	
ΔGOOD *ICW		0.108*			0.214			-0.003	
		(1.688)			(1.322)			(-0.257)	
ΔNET*ICW			0.025			0.025			-0.003
			(0.327)			(0.179)			(-0.429)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included	Included
Constant	0.746***	0.734***	0.743***	0.853***	0.812***	0.820***	0.052***	0.053***	0.053***
	(7.920)	(7.964)	(8.115)	(3.963)	(4.047)	(4.160)	(6.556)	(6.654)	(6.653)
Observations	3,043	3,043	3,043	3,043	3,043	3,043	3,043	3,043	3,043
R-squared	0.159	0.161	0.157	0.087	0.089	0.088	0.054	0.054	0.054
F-value	9.927***	9.021***	9.453***	4.993***	4.520***	4.896***	6.086***	5.458***	6.037***

This table reports the coefficients on the explanatory variables and the summary of the fixed effects panel regression models. **Panel A** shows the regressions of changes in TRD on ICW. Control variables presented in Table 4.3 are included. **Panel B** shows the regressions of market assessment indicators on ICW, changes in TRD, and their interaction. Control variables presented in Table 4.4 are included. Δ denotes change in the aggregate risk disclosure, bad and good news about risk, and net tone of risk, respectively. The change (Δ) indicates the differences between a firm's scores and the median score for other firms in the same industry over the years. Robust standard errors adjusted for clustering at the firm level. T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions, measures, and sources are provided in Appendix A.

Remarkably, Models 7, 8 and 9 in Panel B of Table 4.6 show that ICW reporting leads to a significant and positive increase in investor-perceived risk (t-statistics 2.078 at the 5% level, 1.815 and 1.797 at the 10% significance level, respectively). Thus, all else being equal, the economic significance of receiving ICW reporting is likely to be associated with an increase of investor-perceived risk up to 9.09% (0.002/0.022) of the mean of the market returns volatility (SD). This finding concurs with Kothari et al.'s (2009a) argument that the credibility and timeliness differences in the negative disclosures by source significantly increase stock return volatility. Consistent with the notion that the volatility of stock returns increases (is diverged) if the revealed risk information is unexpected and unknown (Shalen, 1993, Kravet and Muslu, 2013, Campbell, et al., 2014), we rerun Models 7, 8 and 9 using within-firm change analysis. This within-firm change analysis

indicates the differences between each variable in year t+1 and in year t (e.g., Ashbaugh-Skaife et al., 2008; Feng et al., 2009). The unreported results show a significant and positive increase in SD to ICW (t-statistics 2.344, 2.351, and 2.301 at the 5% significance level, respectively). Collectively, this evidence indicates that not only negative or risk disclosures by management, analysts, and business press increase investors' perceived risk (Kothari et al., 2009a) but also the credible ICW reporting by the external auditor. This further validates and extends the findings of Lopez et al. (2009), Clinton et al. (2014), and Church and Schneider (2016) regarding the implications of ICW reporting for investors' risk perceptions and analysts' forecasts, respectively. It is also in line with previous studies on the link between market reaction to ICD reporting document a higher cost of equity (Ashbaugh-Skaife et al., 2009) and negative stock price reactions (Beneish et al., 2008; Hammersley et al., 2008). That is, in turn, a further support for our H2.

In sum, results under Models 1 to 6 of Panel B on the ΔAGG_RISK, ΔBAD_RISK, ΔGOOD_RISK and ΔNET_TONE indicate the informativeness of these unique kinds of risk information. Additionally, we observe that SPREAD under Model 2 is significantly and positively increased with the interaction between good news about risk and ICW reporting (t-statistic 1.688 at the 5% level). This is a further support to our previous finding showing a negative investors' assessment in existence of the conflict between a credible adverse external auditor's opinion on the reliability of the firm's information and management tone about risk (Kothari et al., 2009a). Collectively, these results are qualitatively consistent with our previous finding that stemmed from the level analysis, as shown in Tables 4.3, 4.4 and 4.5.

4.5.4.2. Managers' TRD behavior as a response to the publicly reported ICW

In the previous analyses, we posited and found that the level of TRD (either aggregate risk, and its tone of good news and bad news and the net tone about the risk) is negatively associated with a firm's ineffective internal controls. However, as we discussed before in Section 4.1., the external auditor's identified and publicly reported ICW would prompt managers to provide more information about risk to alleviate investors' uncertainties and agency problems (Jensen and

Meckling, 1976; Leuz and Verrecchia, 2000; Deumes and Knechel, 2008). This change in TRD behavior would occur especially if the ICW is recurrent due to managers' awareness of ICW and the adverse public signal that the reported ICW implies. According to Feng et al. (2009), managers would change their disclosure behavior because that publicly conveyed ICW could, *inter alia*, lead the market to discount their normal disclosure. We, following Ashbaugh-Skaife et al. (2008), Feng et al. (2009) and Donelson et al. (2017), address this issue by conditioning this behavior on managers' awareness about ICW identified by the external auditor, providing further and robust insights into how managers respond to the auditors' attestation on their firms' ICE.[75]

In Panel A of Table 4.7, we estimate equation 4.1 and include a dummy variable (ICW_FIXED) that takes a value of 1 when there is an adverse opinion of external auditor on the firm's internal controls in two successive years and zero otherwise. The level analysis fixed effect regressions of aggregate risk disclosure and its tone on ICW remain consistent with our previous results in Table 4.3. Meanwhile, the coefficients on ICW_FIXED, i.e., recurrence of ICW, indicate that managers of firms that in two successive years received an adverse opinion from the external auditor on their internal controls significantly respond by providing high levels of aggregate risk disclosure and its tone of good news and bad news about the risk (t-statistics 2.848, 2.637 and 2.248 at the 1%, 1% and 5% significance levels, respectively).

Table 4.7.
Results for the change of internal control effectiveness and management behavior
Panel A: Fixed effects panel regressions of TRD on recurrence of ICW

VARIABLES	AGG_RISK	BAD_RISK	GOOD_RISK	NET_TONE
	Model (1)	Model (2)	Model (3)	Model (4)
ICW	-0.049**	-0.011	-0.025***	-0.014**
	(-2.343)	(-1.410)	(-2.933)	(-2.035)
ICW_FIXED	0.116***	0.033**	0.039***	0.013
	(2.848)	(2.248)	(2.637)	(1.028)
Control variables	Included	Included	Included	Included
Constant	0.777***	0.483***	0.066	-0.412***
	(5.226)	(8.630)	(1.040)	(-7.204)
Observations	3,043	3,043	3,043	3,043

[75] There is considerable evidence of managers' motive to respond to risks and disclose on it (e.g., Kasznik and Lev, 1995; Deumes and Knechel, 2008; Miihkinen, 2012; Taylor et al., 2010; Campbell et al., 2014). Kim and Park (2009) indicate that managers would disclose risk information as an uncertainty-clearing disclosure, and the impact of that disclosure would be greater when market suspects the effectiveness of the firm's financial reporting systems.

R-squared	0.018	0.018	0.024	0.049
F-value	2.939***	2.716***	4.172***	7.764***

Panel B: Fixed effects panel regressions of within-firm changes in TRD on changes in ICE (remediation versus recurrence)

VARIABLES	Δ AGG_RISK	Δ BAD_RISK	Δ GOOD_RISK	Δ NET_TONE
	Model (1)	Model (2)	Model (3)	Model (4)
ADV_ADV	0.096**	0.029*	0.038**	0.014
	(2.203)	(1.895)	(2.260)	(0.842)
UNQ_ADV	-0.022	-0.009	-0.009	-0.001
	(-0.711)	(-0.662)	(-0.786)	(-0.072)
ADV_UNQ	0.006	0.001	0.009	0.007
	(0.240)	(0.138)	(0.885)	(0.984)
Control variables	Included	Included	Included	Included
Constant	0.069***	0.019***	0.023***	0.005**
	(10.092)	(7.214)	(8.226)	(2.202)
Observations	1,937	1,937	1,937	1,937
R-squared	0.019	0.020	0.016	0.034
F-value	2.668***	2.897***	2.803***	5.050***

Panel A of this table shows our level analysis and reports the coefficients on the explanatory variables and the summary of the fixed effects panel regression models. ICW_FIXED is a dummy variable equal to 1 when there is an adverse internal control opinion in two successive years. **Panel B** of this table shows our change analysis and reports the coefficients on the explanatory variables and the summary of OLS regression models (the drop in sample size returns to the requirement of data on the difference between successive years). Δ denotes change in the aggregate risk disclosure, bad and good news about risk, and net tone of risk, respectively. The change is also applied for the control variables. The change (Δ) indicates the differences between a firm's score in year *t+1* and its score in year *t*. ADV_ADV, UNQ_ADV, and ADV_UNQ are three dummy indicators of the change in internal control effectiveness where they imply a status where a firm receives two successive adverse internal control opinion, receives an adverse internal control opinion after an unqualified opinion, or receives an unqualified internal control opinion after an adverse opinion. These three distinct groups are introduced relative to a status where a firm has an effective internal control system (UNQ_UNQ).
The two analyses of Panel A and Panel B allow us to answer our question of whether managers respond to the external auditors' attestation on internal control effectiveness. Control variables presented in Table 4.3 are included. Robust standard errors adjusted for clustering at the firm level. T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions, measures, and sources are provided in Appendix A.

Panel B of Table 4.7 shows our within-firm change analysis, where changes in the TRD indicate the differences between a firm's score in year *t+1* and its score in year *t*. We define four distinct cases of the change in ICW and test their effects on within-firm changes in TRD. For these cases, we employ three dummy indicators of the change in internal control effectiveness, where ADV_ADV implies a status of a firm receiving two successive adverse internal control audit opinions (i.e., recurrence of ICW), UNQ_ADV implies a status of a firm receiving an adverse internal control audit opinion after an unqualified opinion, and ADV_UNQ implies a status of a firm receiving an unqualified internal control audit opinion after an adverse opinion (i.e.,

remediation of ICW). These three distinct statuses are introduced relative to a status in which a firm has an effective internal control system (UNQ_UNQ). Following prior studies (e.g., Ashbaugh-Skaife et al., 2008) we utilize OLS regressions to avoid the probably vulnerable application of the fixed effect model when variables have a little within-group variation (Allison, 2009). Employing equation 4.1, but with the three defined dummy variables instead of the ICW variable, we find a significant positive coefficient only on ADV_ADV in terms of its effect on within-firm changes in aggregate risk disclosure, and its tone of good news and bad news about risk (t-statistics 2.203, 2.260 and 1.895 at the 5%, 5% and 10% significance levels, respectively).

Managers' observed response to the identified and publicly reported ICW by positively increasing the level of TRD (particularly, bad news about risk) is not *ipso facto* unexpected to us. Kothari et al. (2009b), consistent with agency theory, indicate that managers typically prefer to keep bad news undisclosed up to a threshold level where it becomes too costly or difficult for managers to withhold. Literature fundamentally links this threshold to incentives that managers face and that affect their willingness to accelerate the disclosure of bad news.[76] For example, Skinner (1994) and Bao et al. (2019) illustrate that litigation risk and reputation concerns prompt managers to quickly release bad news. Thus, the adverse public signal conveyed by the credible audit report on a firm's internal control represents a certain point at which it is seen as too costly and difficult for managers to not reveal bad news about their firm's risk.

Consistent with Feng et al.'s (2009) quality finding, our evidence suggests that whether managers' awareness about their firms ICW precedes or follows ICW definition by the external auditor, the observed changes (increased *quantity*) of their TRD are prompted by the identified and publicly reported ICW. That is, the external auditor's adverse opinion on a firm's internal controls prompts managers to increase their level of TRD to indicate their grasp of their firms' risks (i.e.,

[76] Comparably, managers typically do not delay the disclosure of good news (Kothari et al., 2009b).

bad news about the risk) and their effort to manage it (i.e., good news about risk), an so, in turn reduce uncertainties and agency problems.[77]

4.5.4.3. Corporate communication environment and market reaction

In an untested argument, Gupta et al. (2018) suggest that the rich information context surrounding the dissemination of information, particularly SOX 404 (b) opinion, would probably mitigate observing investors' reaction to such disclosures. Prior event studies, however, indicate that it is expected to find investors' reaction around the filings if those filings convey incremental information content (e.g., Gutierrez et al., 2018). Therefore, testing Gupta et al.'s (2018) argument, we use a short-window test expecting to find a short-term market reaction to the information content of ICW reporting and TRD because of the change of investors' expectations about a firm's future discount rate, cash flows and the reliability of financial reporting. We also expect that investors would react more (less) intensely to risk information of firms with a poorer (richer) communication environment.

Table 4.8.
Testing market reaction to ICW reporting and TRD

VARIABLES	ABRET		
	Model (1)	Model (2)	Model (3)
ICW	0.010**	0.009**	0.009**
	(2.282)	(2.070)	(2.050)
AGG_RISK	0.009***		
	(2.622)		
BAD_RISK		0.035***	
		(3.751)	
GOOD_RISK		-0.016**	
		(-2.382)	
NET_TONE			-0.026***
			(-3.591)
ANALYST	0.001***	0.001***	0.000*
	(2.592)	(2.820)	(1.892)
ANALYST*ICW	-0.001*	-0.001*	-0.001*
	(-1.954)	(-1.697)	(-1.695)
AGG*ANALYST	-0.001***		
	(-2.582)		
BAD*ANALYST		-0.002***	
		(-3.574)	

[77] Our unreported results also suggest that neither the recurrence nor remediation of ICW seems significant to the market participants. Results on the informativeness of ICW and the observed changes in TRD between firms and their industry norm, however, remain significant and qualitatively are consistent with prior results.

GOOD*ANALYST		0.001*	
		(1.889)	
NET*ANALYST			0.002***
			(3.144)
Control variables	Included	Included	Included
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Constant	0.030***	0.030***	0.038***
	(3.796)	(3.944)	(5.465)
Observations	2,870	2,870	2,870
R-squared	0.098	0.103	0.101
F-value	10.71***	10.20***	10.81***

This table reports the coefficients on the explanatory variables and the summary of OLS regression models. It examines market reaction to ICW reporting and TRD using the cumulative absolute abnormal returns (ABRET) of three days surrounding the 10-K filing date. This analysis incorporates the role of corporate communication environment proxied by analyst following (ANALYST; to which data availability reduces sample size). Control variables presenting in Table 4.4 are included. Robust standard errors adjusted for clustering at the firm level. T-statistics in parentheses. Significance level: *** p<0.01, ** p<0.05 and * p<0.1. Variable definitions are provided in Appendix A.

Following prior research (e.g., Botosan 1997; Miller 2010), we employ analyst coverage (ANALYST) as a proxy of the firm's communication environment. Following prior literature (e.g., Garfinkel, 2009; Brown and Tucker, 2011; Hope et al., 2016), we measure the informativeness of ICW reporting and TRD by estimating equation 4.2 while using short-window analysis employing the sum of the absolute value of the three-day abnormal returns surrounding the 10-K filing date (using market-adjusted model methodology, where the market return is the return on the CRSP value-weighted index).78 Using the cumulative absolute abnormal returns (ABRET) enables us to capture the average change in investors' beliefs around the public dissemination of risk information (Gutierrez et al., 2018). Additionally, we include industry and year fixed effects to control for unobserved heterogeneity.

As expected, across the three models reported in Table 4.8, we find a positive (negative) association between ABRET and ICW AGG_RISK and BAD_RISK (GOOD_RISK and NET_TONE) (t-statistics up to 2.282 at the 5%, 2.622 at the 1%, 3.751 at the 1%, -2.382 at the

[78] Our untabulated results remain qualitatively unchanged to use of the standard CAPM market-model, Fama-French three-factor model and Fama-French plus momentum model, as well as for tests of ±3 and ±5 event-day around the 10-K release.

5% and -3.591 at the 1% significance level, respectively).[79] That is, ICW reporting, aggregate risk disclosure and bad news about the risk (good news and net tone about the risk) positively (negatively) affect investors' reaction. Thus, ICW reporting and TRD are useful.[80] It also seems that the investors' reaction in the ±1 event-day test is owing to unexpected information content of the released ICW reporting and TRD (e.g., Kravet and Muslu, 2013).

Moreover, results from Models 1, 2 and 3 of Table 4.8, where the positive (negative) effects of ICW, AGG_RISK and BAD_RISK (GOOD_RISK and NET_TONE) on ABRET are decreased for firms with higher analyst following, i.e., when analyst coverage increases: ANALYST*ICW (t-statistics -1.954, -1.697 and -1.695 at $p<0.1$, respectively); AGG*ANALYST (t-statistic -2.582 at $p<0.01$); BAD*ANALYST (t-statistic -3.574 at $p<0.01$); GOOD*ANALYST (t-statistic 1.889 at $p<0.1$); NET*ANALYST (t-statistic 3.144 at $p<0.01$), strongly accord with our expectations that a firm's communication environment can decrease or increase the incremental information conveyed to investors by ICW reporting and TRD.

4.6. Conclusion

This chapter explores the impact of ICE on the level of TRD (aggregate risk disclosure and its tone including good news, bad news, and net tone about risk). The chapter also examines the usefulness of the ICW reporting and TRD. After controlling for a variety of innate firm characteristics that previous research proposes to be related to incentivizing TRD, and market assessment of risk information conveyed by management and internal control attestation by external auditor, our study offers four major results.

[79] Using ABRET to measure the usefulness of ICW reporting and TRD does not require prediction of the direction of investors' reaction (e.g., Brown and Tucker, 2011; Doyle and Magilke, 2013; Hope et al., 2016). Our expectations, however, are consistent with the theoretical (Shalen, 1993) and empirical (Garfinkel, 2009) literature showing a positive correlation between the information content of a disclosure and the divergence of investors' opinions. That is, larger ABRET, that represents greater information content to a released disclosure, is associated with larger divergence in investors' opinions.

[80] In untabulated tests, we included the interactions between ICW and TRD. Given the shortness of our test period, we found insignificant coefficients on the interaction terms, which is consistent with our earlier expectation that investors cannot promptly interpret TRD and update their judgments on ICW reporting.

First, firms with an ineffective internal control system exhibit significantly lower levels of aggregate risk disclosure and its tone relative to firms with an effective internal control system. Second, consistent with agency theory, the recurrently identified and publicly reported ICW, which represents an adverse public signal, prompts managers to significantly change their TRD behavior by providing higher levels of aggregate risk disclosure and its tone relative to other firms. Third, firms reporting ICW are likely to have more information asymmetry and investor-perceived risk relative to control firms. In spite of the seemingly insignificant effect of TRD on investor-perceived risk, results suggest TRD increases market liquidity. Our evidence also shows that TRD conveys meaningful information that investors may utilize to revise their judgment on ICW reporting. Fourth, we illustrate that the information content of ICW reporting and TRD affect investors' reaction around the 10-K filing, particularly for firms with a weak communication environment. Overall, our results suggest the importance of ICE in addition to the usefulness of ICW reporting and TRD.

Our results have several contributions to both internal control and risk disclosure literature and suggest broader implications to the reporting on internal control effectiveness and risk factors than previously documented. We, however, acknowledge the probable following limitations. First, our market assessment analysis could be slightly affected by the contemporaneous news such as internal control certificates by management under SOX 302 and/or SOX 404 (a) or risk information released by other outlets of corporate communication, including conference calls, financial analysts' reports and/or online resources. Second, bid-ask spread and stock market volatility may proxy for more than only market liquidity and investor-perceived risk (Garfinkel, 2009). Third, for purposes of accuracy, comparability and data availability, we test SOX 404 (b) during the implementation of AS2. By November 15, 2007, however, AS5 replaced AS2, providing a reduction in control auditing requirements and thereby negatively impacting both the effectiveness of firms' internal control systems and precision of external auditor's opinion on the internal control (Schroeder and Shepardson, 2016). Although this does not limit our internal

control inferences, generalizing them to the less rigorous SOX 404 (b) under the AS5 setting should be cautious and we present this point for a further investigation by future research. Future research can also investigate the moderating role of external auditor characteristics like expertise and/or internal corporate governance mechanisms (e.g., board of directors and managerial incentives) for the associations amongst or between internal control, narrative-related disclosures, and market reactions. A fruitful expansion of the present study would be to investigate whether and how internal control may incentivize TRD and the informativeness of TRD in the debt market. Inspecting the effects of company-level versus process-level weaknesses is another potential extension to our study.

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Appendices of Chapter 4

Appendix 4. A. Variable definitions.

Variable	Definition, measures and sources	Unit
Aggregate risk disclosure (AGG_RISK)	All risk information that are exhibited in the narrative sections of the 10-K. The score is the percentage of the number of words indicating risk in the narrative sections of the10-K divided by the total number of words in the 10-K. Textual analysis is processed using Diction 7 software employing the risk wordlist of Elshandidy and Shrives (2016) and SEC EDGAR 10-K form filings accessed through Bill McDonald data repository. The textual analysis is used to further identify the tone of aggregate risk disclosure as introduced below.	%
Bad news about risk (BAD_RISK)	All feasible information about risk that exhibits bad news in the narrative sections of the 10-K. The score is the percentage of the number of words indicating bad news in the narrative sections of the10-K divided by the total number of 10-K words.	%
Good news about risk (GOOD_RISK)	All feasible information about risk that exhibits good news in the narrative sections of the 10-K. The score is the percentage of the number of words indicating good news in the narrative sections of the10-K divided by the total number of 10-K words.	%
Net tone about risk (NET_TONE)	The net influence derived from good news about risk (optimistic residual). The score is the difference between the percentage of good news and the percentage of bad news about the risk.	%
ICW	A dummy variable that takes a value of 1 if the opinion of the external auditor on the effectiveness of internal control is adverse (ICW exists) and 0 otherwise. Data source is Compustat.	0,1
Inside ownership concentration (INSIDE_OWN)	Captured by the percentage of closely held shares (i.e., shares owned by firm insiders) divided by common shares outstanding. Data source is Datastream.	/
Capital structure (DEBT_EQU)	Measured by the ratio of total debt to total equity. Data source is Datastream.	/
Beta (BETA)	Reflects systematic risk and is measured as CAPM beta estimated using weekly returns requiring a minimum of 30 and maximum of 50 observations. Data source is CRSP.	#
Firm size (LN_TA)	Measured as the natural logarithm of total assets. Data source is Compustat.	LN#
Growth (GROWTH)	Measured as the ratio of net sales, $[(sales_t/sales_{t-1}) - 1]$. Data source is Datastream.	/
Profitability (ROE)	Measured by the return on equity ratio as net income before preferred dividends dividing by the year-end common equity. Data source is Datastream.	/
Liquidity (CR)	Measured by the current ratio as total current assets dividing by total current liabilities. Data source is Datastream.	/
Performance (FFO)	Captured by the ratio of net funds from operations to total liabilities. Data source is Compustat.	/
Dividend payout (DIVIDENDS)	A dummy variable that takes a value of 1 if the firms pays dividends, and 0 otherwise. Data source is Compustat.	0,1
Audit quality (BIG_4)	A dummy value that equals 1 if the auditor is a big 4 and 0 otherwise. Data source is Compustat.	0,1

Auditor opinion (AUD_OPIN)	A dummy value that equals 1 if the auditor issued a qualified opinion on financial statements and 0 otherwise. Data source is Compustat.	0,1
Book to market (BM)	Represents book to market ratio, measured by book value of equity to market value of equity. Data source is Compustat.	/
Trading volume (TRAD_VOL)	Measured by the percentage of the mean of the daily trading volume by the number of outstanding shares. Data source is CRSP.	%
Market liquidity (*t+1*) Bid-ask spread (SPREAD)	It is the mean of the relative percentage of spread, which is calculated by dividing the difference between the daily ask and bid prices by the average of the daily ask and bid prices. It is measured (in *t+1)* over a 60 trading days period beginning two trading days after the 10-K filing. Data source is CRSP.	%
Market liquidity (*t+1*) Amihud's (2002) illiquidity ratio (ILLIQ)	It is the mean of the daily ratio of absolute value of stock return divided by dollar trading volume, multiplied by ten million. It is measured (in *t+1)* over a 60 trading days period beginning two trading days after the 10-K filing. Data source is CRSP.	/
Investor-perceived risk (*t+1*) Standard deviation (SD)	It is the mean of the volatility (standard deviation) of the daily market returns. It is measured over a 60 trading days period beginning two trading days after the 10-K filing. Data source is CRSP.	#
Market reaction Cumulative absolute abnormal returns (ABRET)	It is the sum of the absolute value of the three-day abnormal returns surrounding the 10-K filing date (using market-adjusted model methodology, where the market return is the return on the CRSP value-weighted index). Data source is CRSP.	#
Analyst coverage (ANALYST)	It is the number of analysts following the firm. Data source is IBES on Datastream.	#

Appendix 4.B. The complete risk wordlist, and examples of risk-related disclosures

Risk-related keywords	Examples
Aggregate risk Risk, Risks, Risky, Riskiness, Loss, Losses, Decline, Declined, Decrease, Decreases, Decreased, Less, Low, Lower, Fail, Fails, Failed, Failure, Threat, Reverse, Reversed, Against, Catastrophe, Catastrophy, Catastrophic, Shortage, Expose, Exposes, Exposed, Exposure, Unable, Challenge, Challenged, Challenges, Uncertain, Uncertainty, Uncertainties, Gain, Gains, Chance, Chances, Increase, Increases, Increased, Peak, Peaked, High, Highest, Higher, Hedge, Hedging, Diversify, Diversified, Diversification, Diversifications, Fluctuate, Fluctuated, Fluctuation, Fluctuations, Differ, Differed, Difference, Differences, Different, Differential, Differentiate, Differentiated, Differentiation, Probable, Probably, Probability, Probabilities, Possible, Possibly, Significant, Significantly, Significance, Against, Subject, Affect, Affects, Affected, Affecting, Potential, Potentially, Depend, Depends, Depended, Depending, Vary, Varies, Likely, Might, Influence, Influenced, Susceptible, Viable	**0000003673** The commodity price ***risk exposure*** results from market ***fluctuations*** in... The operation of power generation facilities involves many ***risks***, including the ***risk*** of breakdown or ***failure*** of equipment, fuel interruption and performance below expected levels of output or efficiency. Management is ***unable*** to provide assurance that the ultimate cost of decommissioning the Cook Plant will not be ***significantly different*** than current projections. **0000004904** We are therefore ***exposed*** to the ***risk*** that these contractors and other counterparties could breach their obligations to us. Should the counterparties to these arrangements ***fail*** to perform, we may… that may exceed our contractual prices and almost certainly cause delays in that and related projects. This would cause our financial results to be diminished, and we ***might*** incur ***losses*** or delays in completing construction. We ***depend*** on transmission facilities… This dependence ***exposes*** us to a variety of ***risks***. The ***risk*** of ***potential loss*** in fair value attributable to our ***exposure*** to interest rates… **0000898173** Our future performance is ***subject*** to a variety of ***risks*** and ***uncertainties***. The market price of our common stock may be volatile and could ***expose*** us to securities class action litigation. ***Failure*** to meet such expectations, even slightly, could have an adverse effect on the market price of our common stock. ***…failure*** to exercise the renewal option would result in a significant economic penalty.
Good news about risk Gain, Gains, Chance, Chances, Increase, Increases, Increased, Peak, Peaked, High, Highest, Higher, Hedge, Hedging, Diversify, Diversified, Diversification, Diversifications	**0000003673** The sale resulted in a ***gain*** of $94.8 million… AE Supply entered into two treasury lock agreements to ***hedge*** its exposure to changing United States Treasury interest rates on the forecasted issuance of long-term, fixed-rate debt in April 2002. Retail electric revenue ***increased*** due to ***higher*** kWh sales resulting from ***increases*** in the average number of customers served and customer usage. **0000004904** We manage our exposure by establishing risk limits and entering into contracts to offset some of our positions (i.e., to ***hedge*** our exposure to… Our investment strategy for our employee benefit trust funds is to use a ***diversified*** mixture of equity and fixed income securities to preserve the capital of the funds and to maximize the investment earnings in excess of inflation within acceptable levels of risk. Our results for the year reflect the ***increased*** demand from our industrial customers and…

	Favorable weather during summer and fall also ***increased*** our revenues above expected norms. **0000898173** We believe we will ***increase*** the sales to professional installers and will continue to have a competitive advantage over our retail competitors… We have found that the more progressive marketing concepts utilized in the DIY portion of our business have also resulted in ***increased*** sales to our professional installer customers.
Bad news about risk Risk, Risks, Risky, Riskiness, Loss, Losses, Decline, Declined, Decrease, Decreases, Decreased, Less, Low, Lower, Fail, Fails, Failed, Failure, Threat, Reverse, Reversed, Against, Catastrophe, Catastrophy, Catastrophic, Shortage, Expose, Exposes, Exposed, Exposure, Unable, Challenge, Challenged, Challenges, Uncertain, Uncertainty, Uncertainties	**0000003673** International operations are subject to certain additional ***risks*** inherent in conducting business outside the United States, including… Market liquidity has significantly ***declined*** over the past three years. Among other things, significant price volatility... and overall ***declines*** in electricity demand and in the economy, generally, have contributed to this slowdown. ***Catastrophic*** events may exceed reserves or insurance, if any, for repairs, which may adversely impact Allegheny's results of operations and financial condition. The suit alleges that the Board and senior management breached fiduciary duties to AE that have ***exposed*** AE to the securities class action lawsuits. **0000004904** We are ***exposed*** to ***risk*** from changes in the market prices of… Recent lawsuits by the EPA and various states filed ***against*** us highlight the environmental ***risks*** faced by generating facilities, in general, and…. Our revenues and results of operations from selling power are subject to market ***risks*** that are beyond our control. We attempt to manage our ***exposure*** by establishing and enforcing of ***risk*** limits and ***risk*** management procedures. These ***risk*** limits and ***risk*** management procedures may not work as planned and cannot eliminate the ***risks*** associated with these activities. **0000898173** We may ***fail*** or be ***unable*** to discover liabilities of businesses that we acquire for which we, as a successor owner or operator, may be liable. Downturns in the stock market may cause the price of our common stock to ***decline***. If similar litigation were instituted ***against*** us, it could result in substantial costs and a diversion of our management's attention and resources, which could have an adverse effect on our business.

This appendix presents the risk-related keywords, risk tone classification, and examples of the extracted TRD (aggregate and tone). Risk-related keywords are bold italicized.

Chapter 5. Summary and Conclusions

This thesis aims to contribute to literature by addressing a considerable gap about the importance and usefulness of textual disclosures (e.g., Loughran and McDonald, 2016; Dyer et al., 2017; Elshandidy et al., 2018). For this purpose, three empirical chapters are developed with the objective of addressing three unexplored research questions: first, do textual disclosures provide an incremental explanatory power that predicts corporate failure? (e.g., Loughran and McDonald, 2016); second, does the expanded auditor reporting, that recently became effective in the UK and worldwide, have economic benefits for the capital market? (e.g., Gutierrez et al., 2018; Lennox et al., 2019); third, does internal control effectiveness drive a firm to externally disclose its risks, and if so, how, and do the reporting on those risks and the effectiveness of internal controls impact market indicators? (e.g., Schneider et al., 2009; Elshandidy et al., 2018).

The theoretical foundation offered by legitimacy (e.g., Suchman, 1995; Deegan, 2002), agency (e.g., Jensen and Meckling, 1976; Lambert et al., 2007), and signaling (e.g., Akerlof, 1970; Spence, 1973) theories is outlined here as the basis that serves the research background and for rationalizing the findings of this thesis and relating those findings to the evidence from prior research. As presented by the first empirical chapter, the propositions of legitimacy and signaling theories underpin that managers are motivated to disclose on their firms' prospect of failure in order to maintain or repair legitimacy, to avoid reputation loss and litigation risk, and to reduce cost of capital. The second empirical chapter draws insights from the agency theory to explain the usefulness of expanded audit report to capital market participants. That is, the information content of the expanded audit report, which goes beyond the traditional standardized pass/fail audit opinion on the financial statements, is consistent with the notion that a firm's commitment to expanded levels of disclosure should reduce information asymmetry, and hence alleviate the agency problem. Similarly, turning to the third empirical chapter, the quality of a firm's information systems, including the effectiveness of internal control over financial reporting, affects the information asymmetry and risk components of the firm's cost of capital by the increase in the

imparted disclosure. Besides, under normal conditions, signaling theory posits that managers are motived to disseminate information on their firms' risks so as to change risk expectations, reduce litigation risk, improve reputation for transparent and credible disclosure, and, thus, distinguish their firms from other firms that do not manage risks or do so less effectively.

Consequently, this thesis develops the three empirical essays to address the incremental role of textual disclosures (which are also referred to as narrative-related disclosures) in corporate failure (CF) prediction, as well as how such disclosures (particularly that of risk) relate to internal control effectiveness and ultimately the usefulness to the capital market participants, as follows.

In the first essay (Chapter 2), we investigate the predictive ability of narrative-related disclosures by creating a comprehensive list of CF-related keywords. This wordlist enables us to capture the CF sentiment in annual report narratives, i.e., CF-Disclosure. Our results show that greater incidence of CF-Disclosure in the annual reports is strongly associated with a higher likelihood of CF, in both the year immediately prior to failure and the penultimate year. The evidence we find also suggests that CF-Disclosure offers an incremental predictive ability relative to accounting, market and macroeconomic variables that are widely used in the classical CF prediction models. Therefore, CF-Disclosure is feasible in enhancing the explanatory power of the models that predict CF. Additionally, we observe that a financially distressed firm becomes more vulnerable when financial constraints occur, which would accelerate the CF incident. Various robustness tests confirm the credibility of the incremental explanatory power of CF-Disclosure for CF prediction.

In the second essay (Chapter 3), we consider the UK's unique setting, where the revised ISA 700 (UK and Ireland) in 2013 mandated the expanded audit report, which requires the independent auditor to disclose on risks of material misstatement with the greatest effect on the audit, the application of materiality, and the scope of the audit. Accordingly, we investigate: first, whether the expanded auditor's report exhibits information specific to the audited company (thereby the new audit report regime may yield benefits to complying firms through lower information risk that

translates into lower cost of equity); second, whether the reporting regulation change and information content of the expanded audit report affect information asymmetry and risk perceptions.

In cross-sectional tests, we find that firms receiving an expanded audit report with a higher level of disclosure on risks of material misstatement (which we refer to as auditor risk disclosure) exhibit significantly higher beta and cost of equity. Furthermore, we find significantly negative association between auditor disclosed materiality (which is negatively related to the assessed and identified risks of material misstatement) and idiosyncratic risk, beta, and cost of equity. These findings suggest that expanded auditor disclosure is not generic, but is associated with the information risk that a firm presents to investors. Therefore, firms complying with the new reporting rule, which have relatively more reliable financial reporting, i.e., have relatively low risks of material misstatement inducing the auditor to determine a high level of materiality, can benefit from a lower information risk and a lower cost of capital.

Additionally, we use intertemporal tests, where we structure time-series difference and standard post-regulatory panel designs, to investigate the economic usefulness of the audit report regime change, and the information content of expanded auditor disclosure. The evidence we find suggests that the new reporting regime is, on average, related to higher market liquidity (trading volume) and investors' perceived risk (volatility of market returns). Particularly, the intertemporal results of the informativeness of the expanded audit disclosures show that a high level of auditor risk disclosure positively and significantly impacts the trading volume, volatility of market returns, and analyst forecast dispersion. Consistent with the argument that auditor-determined materiality is negatively related to audit effort (Livne et al., 2018), our intertemporal results further indicate that market participants appreciate the firm with a lower level of disclosed materiality due to the higher credibility it indicates about the audited outputs. Specifically, we find a significantly positive (negative) impact of the determined materiality threshold (i.e., low audit effort) on bid-ask spread, (trading volume), and analyst forecast dispersion.

Collectively, our cross-sectional and intertemporal tests, which control for other factors that previous studies show to be related to the above-mentioned measures, as well as endogeneity concern, provide direct evidence that the expanded auditor reporting is firm-specific and useful for financial statement users. This also is consistent with the notion that the expanded auditor's report regime and information content are associated with significant economic consequences for both the complying firms and capital market participants. Our results complement prior experimental studies and archival research on the effect of the expanded auditor's report and its content on the investors' reaction. This, in turn, is supportive of the FRC decision to go beyond the traditional standardized pass/fail audit opinion on the financial statements and helps to relieve related concerns that PCAOB has recently expressed.

In the third essay (Chapter 4), we investigate the impact of internal control effectiveness (ICE) on the level of textual risk disclosure (TRD; i.e., aggregate risk disclosure and its tone including good news, bad news, and net tone about risk). We also examine the usefulness of the internal control material weaknesses (ICW) reporting and TRD. After controlling for a variety of innate firm characteristics that previous research proposes to be related to incentivizing TRD, and market assessment of risk information conveyed by management and internal control attestation by the external auditor, this study offers four major results.

First, firms with an ineffective internal control system exhibit significantly lower levels of aggregate risk disclosure and its tone relative to firms with an effective internal control system. Second, consistent with agency theory, the recurrently identified and publicly reported ICW, which represents an adverse public signal, prompts managers to significantly change their TRD behavior by providing higher levels of aggregate risk disclosure and its tone relative to other firms. Third, firms reporting ICW are likely to have more information asymmetry and investor-perceived risk relative to control firms. In spite of the seemingly insignificant effect of TRD on investor-perceived risk, results suggest that TRD increases market liquidity. Our evidence also shows that TRD conveys meaningful information that investors may utilize to revise their judgment on ICW

reporting. Fourth, the study indicates that the information content of ICW reporting and TRD affect investors' reaction around the 10-K filing, particularly for firms with a weak communication environment.

Overall, our results suggest the importance of ICE in addition to the usefulness of ICW reporting and TRD. Our results have several contributions to both internal control and risk disclosure literature and suggest broader implications to the reporting on internal control effectiveness and risk factors than previously documented.

In summary, the results given above principally add to literature on the importance and usefulness of textual disclosures: first, by indicating the feasibility of textual disclosures in objectively and directly predicting CF and enhancing the explanatory power of CF classical prediction models, second, by supporting the view of FRC (followed by IAASB and PCAOB) that the expanded audit report is useful for both the complying companies and capital market participants, and third, by expanding prior research on the importance of ICE to improve financial reporting reliability and showing the usefulness of ICE reporting and TRDs to capital market participants.

The results summarized above have some distinctive implications. First, the additional role of textual disclosures in rendering early warning alerts about failure prospect is imperative to help interested parties (e.g., FRC) to take either preventive or remedial actions. It also helps in improving the classical CF prediction models. Second, addressing regulators' (FRC, IAASB, & PCAOB) concerns by documenting the significant economic consequences of expanded audit report regime and information content for both the complying companies and capital market. Speaking directly to IAASB and PCAOB about auditor disclosure on the determined materiality as an important component of the expanded audit report. Third, showing the broader implications and rationalizing the debate around the importance of ICE (SOX 404(b)) in improving financial reporting reliability. The evidence of the usefulness of ICE reporting and TRD should be of particular interest to regulators (AICPA, SEC, PCAOB).

Consistent with prior research in the field, this thesis is subject to some caveats that might be viewed as promising avenues for future research. The results of Chapter 2 should be interpreted taking into consideration the following limitations. First, despite the rational premise of our legal and financial definition of CF, it could be a consequence of various reasons such as an ethical problem of management, like committing fraud (Hsu and Wu, 2014). Second, annual reports are used because they represent a key source of information for investors. Nevertheless, other outlets of corporate communication (e.g., financial analysts' reports, conference calls and/or online resources) could contain unique signals of the likelihood of failure. Third, this study adopts a quantity-based methodology in measuring CF-Disclosure, without gauging the quality. These limitations might provide avenues for future research on CF.

Although endogeneity is a general problem in capital market research, and despite our powerful research design to address this problem, the inability to find reasonable counterfactuals to premium-listed companies in the UK setting might be seen as one limitation of Chapter 3. We also acknowledge the following probable limitations for Chapter 4. First, our market assessment analysis could be slightly affected by contemporaneous news such as internal control certificates by management under SOX 302 and/or SOX 404 (a) or risk information released by other outlets of corporate communication, including conference calls, financial analysts' reports and/or online resources. Second, bid-ask spread and stock market volatility may proxy for more than only market liquidity and investor-perceived risk (Garfinkel, 2009). Third, for purposes of accuracy, comparability and data availability, we test SOX 404 (b) during the implementation of AS2. On November 15, 2007, however, AS5 replaced AS2, reducing control auditing requirements and thereby negatively impacting the effectiveness of firms' internal control systems and the precision of the external auditor's opinion on internal control (Schroeder and Shepardson, 2016). Although this does not limit our internal control inferences, generalizing them to the less rigorous SOX 404 (b) under the AS5 setting should be cautious and we suggest further investigation of this point in future research.

Future research can also investigate the moderating role of external auditor characteristics like expertise and/or internal corporate governance mechanisms (e.g., board of directors and managerial incentives) for the associations amongst or between internal control, narrative-related disclosures, and market reactions. A fruitful expansion of the present study would be to investigate whether and how internal control may incentivize TRD and the informativeness of TRD in the debt market. Inspecting the effects of company-level versus process-level weaknesses is another potential extension to our study.

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